CONSERVATION LAW FOUNDATION

Protecting New England's Environment

March 23, 2009

HAND-DELIVERED

The Honorable Eileen Fox, Clerk
New Hampshire Supreme Court
Supreme Court Building
One Charles Doe Drive
Concord, New Hampshire 03301

RE: Appeal of Stonyfield Farm, Inc., H & L Instruments, LLC, and Great American Dining, Inc. Under RSA 541:6 and RSA 365:21 From Order of the Public Utilities Commission

Dear Clerk Fox:

Enclosed for filing in the above-referenced matter please find an original plus eight copies of:

(1) Brief of Amici Curiae, Campaign for Ratepayers' Rights, Clean Water Action, Conservation Law Foundation, Resident's Environmental Action Committee for Health, New Hampshire Sierra Club, and Union of Concerned Scientists; and,

(2) Assented-To Motion for Leave to File Amici Curiae Brief.

Two copies of the within motion and brief are being sent this day to all parties of record in this docket.

Thank you for your assistance in this matter.

Very truly yours,

Kristine E. Kraushaar

Kristine E. Kraushaar, Esq.
Staff Attorney

KEK/dlh

Encls.

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THE STATE OF NEW HAMPSHIRE
SUPREME COURT

2009 TERM
MARCH SESSION

NO. 2008-0897

APPEAL OF STONYFIELD FARM, INC. & a.

ASSENTED-TO MOTION FOR LEAVE TO FILE *AMICUS CURIAE* BRIEF

Pursuant to New Hampshire Supreme Court R. 30, Campaign for Ratepayers' Rights ("CRR"), Clean Water Action ("CWA"), Conservation Law Foundation ("CLF"), New Hampshire Sierra Club ("Sierra Club"), Resident's Environmental Action Committee for Health ("REACH"), and Union of Concerned Scientists ("UCS"), (together "movants"), respectfully request leave of Court to participate in the above-captioned matter through the filing of a brief of *amici curiae*. In support of this assented-to motion, movants state as follows:

1. The Campaign for Ratepayers Rights ("CRR") is a statewide non-profit organization founded in 1983. CRR has studied all aspects of electric policy in New Hampshire. CRR has concentrated particularly on the interests of homeowners and small businesses. Issues of concern include total costs of power generation, including risks of operation, nuclear decommissioning, and radioactive waste storage. CRR has promoted conservation and efficiency and pollution reduction. Electric deregulation has not delivered the savings that were originally promised. To that end, CRR has promoted the continued ownership of PSNH's remaining, regulated, electric generating stations. With an emphasis on costs, CRR advocates that New Hampshire should look before we leap into the unknown on large construction projects.

2. Clean Water Action ("CWA") is a national non-profit citizens' organization working for clean, safe and affordable water, prevention of health-threatening pollution, creation of environmentally-safe jobs and businesses, and empowerment of people to make democracy work. Clean Water Action organizes strong grassroots groups, coalitions, and campaigns to protect our environment, health, economic well-being, and community quality of life.

3. CLF is a non-profit, member-supported environmental advocacy organization, with over 3,300 members, including over 370 members residing in New Hampshire. Founded in 1966, and with offices in Concord, New Hampshire; Brunswick, Maine; Montpelier, Vermont; Boston, Massachusetts; and Providence, Rhode Island, CLF has a long history of addressing environmental issues facing communities throughout New England. CLF's advocacy in New Hampshire and throughout New England often has addressed the environmental impacts associated with coal-fired power plants. CLF has expertise in the areas of climate change, air pollution regulation, and energy policy.

4. The 6,000 members of the New Hampshire Sierra Club are proud to be part of America's oldest, largest and most influential grassroots environmental organization. Nationally, the Sierra Club has 750,000 members and dedicates itself to promote the responsible use of the earth's ecosystems. The New Hampshire Chapter focuses on issues effecting New Hampshire such as clean air, clean water, global warming, and the protection of wild places. The Club is non partisan and strives to bring people together to find solutions for New Hampshire's ecological challenges.

5. Resident's Environmental Action Committee for Health ("REACH") is a non-profit organization duly organized and existing under the laws of the State of New Hampshire, with over 2,000 members. The purpose of REACH is to engage in education and community outreach and action in furtherance of environmental and related projects and issues. The majority of REACH's members are residents of the communities immediately surrounding the Merrimack Station, and who thereby have a vested interest in regulatory, fiscal, environmental, safety and health issues related thereto. As such, the matters set forth herein directly and significantly affect the rights, duties, privileges, immunities and other substantial interest of REACH and its members.

6. The Union of Concerned Scientists ("UCS") is the leading science-based nonprofit working for a healthy environment and a safer world. Working with more than 200,000 members and activists, UCS combines independent scientific research and citizen action to develop innovative, practical solutions and secure responsible changes in government policy, corporate practices, and consumer choices.

7. Counsel of record for the Petitioners/Appellants, Attorney Edward A. Haffer, and and counsel of record for Appellee Public Service Company of New Hampshire, Attorney Robert Bersak, indicate their clients assent to this motion.

8. Based on their extensive environmental experience, and, with respect to CRR, ratepayer advocacy experience, the movants have a unique understanding of the issues presented in the pending appeal.

9. Because of the far-reaching implications of the Commission's decision, and in light of the special expertise of the movants with respect to the potential environmental and energy policy implications of that decision, movants respectfully

suggest that the attached brief will be of assistance to the Court in its deliberations on this matter

10. Movants have this day conditionally filed an original plus eight copies of a Brief of *Amici Curiae* In Support of Petitioners/Appellants Stonyfield Farm, Inc., *et al.*

WHEREFORE, the movants respectfully request that this Honorable Court:

A. Grant the instant motion and allow the movants to participate in this appeal as *amici curiae*, through the filing of a brief of *amici curiae*; and

B. Grant such other relief as it deems appropriate and just.

Respectfully Submitted,

CAMPAIGN FOR RATEPAYERS' RIGHTS

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Date: March 23, 2009

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the within pleading has this day been sent via U.S. Postal Service, first-class mail, postage prepaid, to Attorney Robert Bersak, counsel for Public Service Company of New Hampshire; Attorney Edward A. Haffer, counsel for Stonyfield Farm, Inc., *et al.*; Meredith Hatfield, Esq., counsel for Office of Consumer Advocate; and, F. Anne Ross, Esq., counsel for the New Hampshire Public Utilities Commission.

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THE STATE OF NEW HAMPSHIRE
SUPREME COURT

2009 TERM
MARCH SESSION

NO. 2008-0897

APPEAL OF STONYFIELD FARM, INC., H & L INSTRUMENTS, LLC, AND GREAT AMERICAN DINING, INC. UNDER RSA 541:6 AND RSA 365:21 FROM ORDER OF THE PUBLIC UTILITIES COMMISSION

BRIEF OF AMICI CURIAE CAMPAIGN FOR RATEPAYERS' RIGHTS CLEAN WATER ACTION CONSERVATION LAW FOUNDATION RESIDENT'S ENVIRONMENTAL ACTION COMMITTEE FOR HEALTH NEW HAMPSHIRE SIERRA CLUB UNION OF CONCERNED SCIENTISTS

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STATUTORY PROVISIONS

RSA 378:37-42 Least Cost Energy Planning

378:37 New Hampshire Energy Policy. The general court declares that it shall be the energy policy of this state to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of nonrenewable resources; and consideration of the financial stability of the state's utilities.

378:38 Submission of Plans to the Commission. Pursuant to the policy established under RSA 378:37, each electric utility shall file a least cost integrated resource plan with the commission at least biennially. Each such plan shall include, but not be limited to, the following:

I. A forecast of future electrical demand for the utility's service area.
II. An assessment of demand-side energy management programs, including conservation, efficiency improvement, and load management programs.
III. An assessment of supply options.
IV. An assessment of transmission requirements.
V. Provision for diversity of supply sources.
VI. Integration of demand-side and supply-side options.
VII. An assessment of plan integration and impact on state compliance with the Clean Air Act Amendments of 1990.
VIII. An assessment of plan integration and impact on state compliance with the National Energy Policy Act of 1992.
IX. An assessment of the plan's long- and short-term environmental, economic and energy price and supply impact on the state.

378:39 Commission Evaluation of Plans. The commission shall review proposals for integrated least-cost resource plans in order to evaluate the adequacy of each utility's planning process. In deciding whether or not the utility's planning process is adequate the commission s hall consider potential environmental, economic and health-related impacts of each proposed option. The commission is encouraged to consult with appropriate state and federal agencies, alternative and renewable fuel industries, and other organizations in evaluating such impacts. Where the commission determines the options have equivalent financial costs, equivalent reliability, and equivalent environmental, economic and health-related impacts, the following order of priorities shall guide the commission's evaluation:

I. Demand-side management;
II. Renewable energy sources;
III. All other energy sources.

378:40 Plans Required. No rate change shall be approved or ordered with respect to any utility that does not have one file with the commission a plan that has been filed and reviewed in accordance with the provisions of RSA 378:38 and RSA 378:39. However, nothing contained in

this subdivision shall prevent the commission from approving a change, otherwise permitted by statute or agreement, where the utility has made the required plan filing in compliance with RSA 378:38 and the process of review is proceeding in the ordinary course but has not been completed.

378:41 Conformity of Plans. Any proceeding before the commission initiated by a utility shall include, within the context of the hearing and decision, reference to conformity of the decision with the least cost integrated resource plan most recently filed and found adequate by the commission.

378:42 Existing Rate Plans. Notwithstanding the requirements of RSA 378:37-41, nothing contained in this subdivision shall impair or change the provisions of any agreement or rate plan approved by the commission in accordance with RSA 362-C:6.

QUESTIONS PRESENTED FOR REVIEW

Amici respectfully refer the Court to the questions presented for review set forth in the brief of Appellants Stonyfield Farm, Inc., H & L Instruments, LLC, and Great American Dining (collectively "Commercial Ratepayer Group"), (hereinafter referred to as "CRG Brief").

STATEMENT OF THE CASE AND FACTS

The undersigned *amici*, Campaign for Ratepayers' Rights ("CRR"), Clean Water Action ("CWA"), Conservation Law Foundation ("CLF"), New Hampshire Sierra Club ("Sierra Club"), Resident's Environmental Action Committee for Health ("REACH"), and Union of Concerned Scientists ("UCS"), submit this *amicus* brief in support of the CRG Brief.

Interests Of Amici Curiae.

The Campaign for Ratepayers Rights ("CRR") is a statewide non-profit organization founded in 1983. CRR has studied all aspects of electric policy in New Hampshire. CRR has concentrated particularly on the interests of homeowners and small businesses. Issues of concern include total costs of power generation, including risks of operation, nuclear decommissioning, and radioactive waste storage. CRR has promoted conservation and efficiency and pollution reduction. Electric deregulation has not delivered the savings that were originally promised. To that end, CRR has promoted the continued ownership of PSNH's remaining, regulated, electric generating stations. With an emphasis on costs, CRR advocates that New Hampshire should look before we leap into the unknown on large construction projects.

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Conservation Law Foundation ("CLF") is a non-profit, member-supported environmental advocacy organization with over 3,300 members, including over 370 members residing in New Hampshire. Founded in 1966, and with offices in Concord, New Hampshire; Brunswick, Maine;

Montpelier, Vermont; Boston, Massachusetts; and Providence, Rhode Island, CLF has a long history of addressing environmental issues facing communities throughout New England. CLF's advocacy in New Hampshire and throughout New England often has addressed the environmental impacts associated with coal-fired power plants.

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The Union of Concerned Scientists ("UCS") is the leading science-based nonprofit working for a healthy environment and a safer world. Working with more than 200,000 members and activists, UCS combines independent scientific research and citizen action to

develop innovative, practical solutions and secure responsible changes in government policy, corporate practices, and consumer choices.

Factual And Procedural Background.

Amici respectfully refer the Court to the statement of the case set forth in the CRG Brief.

SUMMARY OF ARGUMENT

Public Service Company of New Hampshire ("PSNH") now estimates that the installation of wet flue gas desulphurization technology at Merrimack Station, ("Scrubber Project") mandated by RSA 125-O, *et seq.* ("Scrubber Law"), will cost $457 million—eighty-three percent more than PSNH's original cost estimate of $250 million. *See* Testimony of Terry Large on 2006 HB 1673-FN (April 11, 2006); Letter from Michael P. Nolin to the Honorable Bob Odell, Chairman NH Senate Energy, Environment, and Economic Development Committee (April 11, 2006). Modifications to PSNH's largest turbine, Merrimack Unit 2 ("MK2"), which PSNH has represented to the New Hampshire Department of Environmental Services ("DES") are necessary to satisfy Scrubber Project power requirements,[1] have cost, to date, $11.4 million, and that cost is not included within the estimated $457 million. *See* PSNH Response to Data Request TS-01, PUC Docket No. DE 08-145 (February 20, 2009), Appendix (hereinafter "App.") at A-2.

Despite the fact that the New Hampshire law governing divestiture of PSNH's generation assets unambiguously requires PSNH to obtain a public interest finding from the New Hampshire Public Utilities Commission ("Commission") *before* modifying its generation assets,

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[1] *See* Letter from William H. Smagula, Director-Generation, PSNH, to Robert R. Scott, Director Air Resources Division, DES (June 7, 2006), at 1-2, App. at A-9-A-10 ("[T]o maintain the generation output and value to customers, the large power consumption of a scrubber system—as much as 6 to 10 megawatts, *justified the need to fully assess balance of plant improvements necessary to offset the additional load . . . installation of a scrubber will require . . . balance of plant work, MK2 high pressure /intermediate pressure (HP/ IP) turbine and generator work, in addition to the installation of the scrubber vessel* . . . . Completion of the MK2 HP/IP turbine and generator projects is expected to maintain the reliability and output of MK2, and *allow for the operation of the scrubber.*" (emphasis supplied); Letter from William H. Smagula, Director-Generation, PSNH, to Robert R. Scott, Director Air Resources Division, DES (January 31, 2008), at 1, App. at A-13 ("the balance of plant projects planned to be completed during the 2008 MK2 outage, including the HP/IP project and associated generator repair work, *are necessary in order to maintain the output of MK2 and comply with RSA 125-O:13 which requires PSNH to install a wet scrubber at Merrimack Station, no later than July 2013.*") (emphasis supplied).

see RSA 369-B:3-a, PSNH has taken the position that the Scrubber Law exempts it from that obligation.[2]

Nothing in the Scrubber Law suggests that the New Hampshire Legislature intended that law to be a blank check for PSNH. Yet, PSNH has attempted to use the Scrubber Law to shield the Scrubber Project and related MK2 capacity expansion from full, transparent Commission review and consequently the Project has nearly doubled in cost and PSNH has virtually reconstructed its largest turbine without prior Commission approval.[3]

The 2006 decision to mandate the Scrubber Project was the right choice at that time; circumstances have changed significantly since then, however, amplifying the urgent need for Commission review. Review of the Scrubber Project now will ensure that Scrubber Project costs are warranted, especially in light of costs associated with reasonably anticipated future environmental regulations related to carbon dioxide emissions, cooling water discharges, and mercury emissions, and other costs—together estimated to be in the range of $852 million to $2.48 billion, *in addition* to the $457 million Scrubber Project and $11.4 million MK2 capacity expansion costs. Kenneth A. Colburn, *Compendium of Concerns Regarding the Proposed Installation of a Scrubber at PSNH's Merrimack Station in Bow, NH* (January 5, 2009) (hereinafter "Colburn Compendium"), at 1, App. at A-19.

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2 Indeed, during a technical session on February 3, 2009, before the Commission in DE 08-145, counsel for PSNH represented that it is PSNH's position that the Scrubber Law allows PSNH to increase MK2's capacity by an unlimited, or "*infinite*" (PSNH's counsel's term) amount—in excess of any amount required merely to address parasitic load, without coming to the Commission in advance, and subject only to post hoc prudence review. *See also,* PSNH's Proposed Stipulated Facts in Docket No. DE 08-145 (February 3, 2009) (items 14 and 15).

3 In addition, several parties have sought a declaratory ruling that the Project should be reviewed by the New Hampshire Site Evaluation Committee (PSNH sought no such review). *See* Motion for Declaratory Ruling Regarding Modifications to Merrimack Station Electric Generating Facility, by Campaign for Ratepayers Rights, CLF, Freedom Logistics LLC, Granite Ridge Energy LLC, Halifax- American Energy Company LLC, TransCanada Hydro Northeast Inc., and the Union of Concerned Scientists (March 6, 2009). Sierra Club, CLF, and Freedom Logistics LLC have filed appeals of the Scrubber Project Temporary Permit with the DES Air Resources Council, asserting, *inter alia*, that PSNH failed to obtain necessary permits for aspects of the Project and related activities.

Such review would be consistent with the Commission's recognized authority, under RSA 378:39, to review the question whether Merrimack retirement should be considered, taking into account any necessary and significant costs associated with its continued operation. *See* Commission Order No. 24, 945, PSNH Least Cost Integrated Resource Plan ("LCIRP") Docket, Docket DE 07-108 (February 27, 2009), (hereinafter, "LCIRP Order"), at 16, App. at A-57. The nearly doubled Scrubber Project and related costs, plus substantial future environmental compliance costs, are just such costs.

CLF and Freedom Logistics LLC have also served PSNH with notices of intent to sue pursuant to the citizen suit provisions of the Clean Air Act in connection with those same claims.

ARGUMENT

I. REVIEW OF THE SCRUBBER PROJECT WOULD BE CONSISTENT WITH THE COMMISSION'S AUTHORITY PURSUANT TO RSA 378:39.

The Commission has recognized its authority, under RSA 378:39, to review the question whether Merrimack Station retirement is an option in light of any "expenditure of significant investment dollars" associated with its continued operation. *See* LCIRP Order, at 16, App. at A-57.

Specifically, the Commission found:

> Merrimack Continued Unit Operation Study.
>
> Early retirement of existing power plants for economic reasons is a practical option for utility planners *if continued operation entails the expenditure of significant investment dollars*. For this reason, we will require PSNH to include in future LCIRPs an economic analysis of retirement for any unit *in which the alternative is the investment of significant sums to meet new emissions standards and/or enhance or maintain plant performance*. PSNH will not, however, be required to include an analysis of divestiture in its next LCIRP as set forth in Order No. 24,695.

Id. (emphasis supplied).

Consistent with New Hampshire's energy policy[4], the New Hampshire Legislature requires least cost energy planning, also known as least cost integrated resource planning, for PSNH. RSA 378:37-378:42. PSNH must file a LCIRP with the Commission every other year. RSA 378:38.[5] The plan must include, *inter alia,* an assessment of the plan's long- and short-

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[4] *See* RSA 378:37 (stating, "to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of non renewable resources; and consideration of the financial stability of the state's utilities").

[5] Entitled "Submission of Plans to the Commission," RSA 378:38 requires that each plan include, but not be limited to the following:

I. A forecast of future electrical demand for the utility's service area

II. An assessment of demand-side energy management programs, including conservation, efficiency improvement, and load management programs.

term environmental, economic and energy price and supply impact on the state. RSA 378:38, IX. The Commission, in turn, reviews PSNH's plan and evaluates the adequacy of its planning process. RSA 378:39. To determine whether a utility's planning process is adequate, the Commission must "consider potential environmental, economic and health-related impacts of each proposed option." RSA 378:39. If the Commission determines the options are equivalent in terms of financial costs, reliability and environmental, economic and heath-related impacts, the Commission's evaluation must be guided by the following order of priorities: (1) demand-side management; (2) renewable energy sources; and (3) all other energy sources. *Id.*

Requiring PSNH to undertake an analysis to determine whether continued operation of Merrimack Station remains economically feasible in light of increased Scrubber Project costs, MK2 capacity expansion costs, and anticipated costs associated with additional future environmental regulation—particularly "significant sums to meet new emissions standards"—is precisely what is called for here. The LCIRP Order, however, does not require that analysis to be completed until sometime after February 2010. *See* LCIRP Order, at 20, App. at A-61 (requiring such analysis in future LCIRPs, but not the next one scheduled for February, 2010). By then, PSNH will have expended millions at the vintage Merrimack Station. The state's energy policy, embodied in RSA 378:39 mandates a planning process that is forward-looking to assess economic feasibility before the point of no return. The Commission should exercise its

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III. An assessment of supply options.
IV. An assessment of transmission requirements.
V. Provision for diversity of supply sources.
VI. Integration of demand-side and supply-side options.
VII. An assessment of plan integration and impact on state compliance with the Clean Air Act Amendments of 1990.
VIII. An assessment of plan integration and impact on state compliance with the National Energy Policy Act of 1992.
IX. An assessment of the plan's long- and short-term environmental, economic and energy price and supply impact on the state.

recognized authority to undertake review of such considerations now, while it can inform a reasoned decision making process, not after the fact.

II. THE COMMISSION HAS A DUTY TO TAKE INTO ACCOUNT CHANGED CIRCUMSTANCES AS EVIDENCED BY SIMILAR RECENT UTILITY COMMISSION ACTION IN OTHER STATES.

The Commission is an executive agency mandated to implement state energy policy consistent with state law and serve as "the arbiter between the interests of the customer and the interests of regulated utilities." RSA 363:17-a. To that end, the Commission gathers information from utilities operating in New Hampshire and uses that information to inform decisions about whether and how to regulate the utilities' rates and services. *See, e.g.*, RSA 365:4 (delegating to the Commission both the "power" and the "duty, to keep informed as to all public utilities in the state"); RSA 374:5 (requiring every utility to report to the Commission cost information before making any additions or improvements).

An emerging national trend confirms that public utility commissions are undertaking reviews of similar projects. The Wisconsin Public Service Commission recently approved funding for a study to examine the economic feasibility of adding nitrogen oxide emissions controls at the 380 megawatt Edgewater 5 coal-fired power plant, which began operating in 1985. *See* "PSC OK's Money for Two Environmental Groups to Study WPL's Pollution Control Plan for Coal Plant," The Wisconsin State Journal (March 13, 2009). The project would cost $150 million, and eliminate seventy-five percent of nitrogen oxide emissions by 2011. *Id.*

Just this month, Louisiana's Public Service Commission temporarily suspended work on the $1.8 billion Little Gypsy repowering project to "review the economics" of a new petroleum coke and coal upgrade in light of lower gas prices, climate change concerns, and rising project

costs. *See* Alan Sayr, "PSC Suspends Power Project," Associated Press, via Forbes.com (March 11, 2009).

Concerns over the impact of carbon dioxide emissions regulations, more stringent mercury emissions regulations, and restrictions on coal ash management practices on the price of coal-fired electric generation are also being debated in Ohio. *See* Spencer Hunt, "Feds Target Coal-Fired Pollution: Stricter Rules on Carbon Dioxide, Mercury Likely Would Raise Power Rates," The Columbus Dispatch (March 14, 2009). Utilities have candidly acknowledged the anticipated rate impact of carbon dioxide regulations, and some have joined with efforts to promote federal regulation to gain the benefit of policy certainty. *See* John Fleck, "PMN Looks to the Future," Albuquerque Journal (March 16, 2009).[6]

III. COMMISSION REVIEW IS IMPERATIVE IN LIGHT OF SUBSTANTIALLY CHANGED CIRCUMSTANCES

The 2006 decision to mandate the Scrubber Project was the right choice at that time, based on PSNH's then-estimated project cost of $250 million.[7] Mercury is a potent neurotoxin that accumulates in the environment and can have serious health effects on animals and humans. *See, e.g.,* U.S. Environmental Protection Agency, *Mercury Basic Information, available at* http://www.epa.gov/mercury/about.htm. Coal-burning power plants, like Merrimack Station, are the largest human-caused source of mercury emissions in the United States, accounting for over

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[6] "'There is no bigger risk that can impact you long term in our business than climate change,' [Jeff] Sterba, chief executive officer of PMN told the Journal in an interview. Sterba explains the risk this way: If PMN needs a new long-term source of energy, it could build a coal plant that might generate electricity for 5 cents per kilowatt hour. That would make coal among the cheapest sources of power out there. But climate change regulations, through some sort of a tax on emissions or 'cap and trade' system could drive that cost in the future to 10 or 15 cents for the same kilowatt hour of electricity, according to Sterba. For a long-lived power plant, that creates enormous economic uncertainty. 'What you put up stays up for 60 years,' Sterba said. 'That is an enormous risk.'" John Fleck, "PMN Looks to the Future," Albuquerque Journal (March 16, 2009).

[7] *See* Testimony of Terry Large on 2006 HB 1673-FN (April 11, 2006); and Letter of Michael P. Nolin to the Honorable Bob Odell, Chairman NH Senate Energy, Environment, and Economic Development Committee (April 11, 2006) (reporting that "[b]ased on data shared by PSNH, the total capital cost for this full redesign will not exceed $250 million dollars (2013$) or $197 million (2005$).").

forty percent of all human-caused mercury emissions. *Id.* Reducing mercury emissions from Merrimack Station remains an essential objective. The Scrubber Project cost increase, coupled with imminent federal carbon dioxide and mercury regulation and other anticipated costs, leave open, however, the question whether the Scrubber Project is the best means to accomplish mercury reduction goals. *See generally*, Colburn Compendium, App. at A-17.

A. Scientific Consensus On Accelerated Rate of Climate Change Is Driving Regulatory Action That Will Substantially Increase The Cost Of Coal-Fired Power.

Merrimack Station is the largest single source emitter of global warming pollution in New Hampshire. *See,* Correspondence Joseph T. Fontaine, DES Emission Reduction Trading Programs Manager, to Melissa A. Hoffer (March 23, 2009). PSNH reported 2007 estimated emissions of 3.7 million tons of carbon dioxide—nearly twenty percent of New Hampshire's annual total. *See* ISTEPS Power Plants Emissions Data (2007 inventory), at 6, App. at A-68. The Scrubber Project will not reduce Merrimack Station's carbon dioxide emissions; indeed, the recent modifications to MK2 to address scrubber parasitic load may ultimately increase the facility's carbon dioxide emissions. *See* Letter from William H. Smagula, Director-Generation, PSNH, to Robert R. Scott, Director Air Resources Division, DES, (June 7, 2006) (noting six to 13 megawatt increase), at 3, App. at A-11. Further, in January 2009, PSNH made an interconnection request to the Independent System Operator Administered Transmission System to increase the winter net capacity of a steam turbine unit (likely MK2) to 353.3 megawatts (which would represent an increase of 31.75 megawatts over MK2's current 321.75 winter claimed capacity) by the projected commercial operation date of December 14, 2009. *See,* "Interconnection Requests to the Administered Transmission System" (January 31, 2009) (hereinafter "ISO Request"), at 4, App. at A-73. (PSNH Queue Position 291).

1. *Climate science shows change is occurring more quickly than anticipated.*

The effects of global warming, should it continue unabated, likely will be devastating globally and locally. The United States Environmental Protection Agency ("EPA") estimates that average temperatures in New Hampshire could rise another four to five degrees by 2100—increases that would place at great risk the natural resources that define New Hampshire's unique geography and on which New Hampshire's economy depends for survival. *See* EPA Office of Policy, Planning and Evaluation, *Climate Change and New Hampshire Fact Sheet.*[8]

In *Massachusetts v. EPA*, the United States Supreme Court confirmed the urgency of the climate change threat:

> The harms associated with climate change are serious and well recognized. Indeed the [National Research Council] Report itself—which EPA regards as an objective and independent assessment of the relevant science, identifies a number of environmental changes that have already inflicted significant harms, including the global retreat of mountain glaciers, reduction in snow-covered extent, the earlier spring melting of rivers and lakes, and the accelerated rate of rise of sea levels during the 20th century relative to the pas few thousand years.

Mass. v. EPA, 549 U.S. 497, 127 S.Ct. 1438, 1454–1456 (2007) (internal citation omitted).

Recent data show that changes originally projected by scientists to occur decades in the future are occurring now. *See, e.g.,* Intergovernmental Panel on Climate Change, *Fourth Assessment Report, Summary for Policymakers* (2007).[9] Science has made it increasingly evident that the global community faces an urgent climate emergency, and that immediate action

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[8] *Available at* http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/SHSU5BVJDV/$File/nh_impct.pdf.

[9] *Available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

to reduce emissions of greenhouse gases must be taken to avert global warming's most catastrophic consequences. *Id.*

The question is no longer if, but when, power plants will be regulated more stringently, and all signs indicate that these controls are coming sooner rather than later. Increased carbon dioxide emissions controls will lead to steep compliance costs for Merrimack Station—costs estimated between $717 million to $2.15 billion for carbon allowances. *See,* Colburn Compendium, at 5, App. at A-23.

2. *Federal regulation of carbon dioxide is imminent.*

The Obama administration has announced its support for an economy-wide cap-and-trade program aimed at reducing carbon dioxide emissions by fourteen percent from 2005 levels by 2020 and eighty-three percent from 2005 levels by 2050. *See, e.g.,* Fiscal Year 2010 Budget Overview Document "A New Era of Responsibility: Renewing America's Promise," *available at* http:///www.whitehouse.gov, p. 21. The Obama administration's proposed federal budget, issued on February 26, 2009, anticipates revenue from a federal carbon dioxide trading program by 2012. *Id.* Federal carbon dioxide regulation, with which PSNH will have to comply, is expected to impose more stringent (and costly) limits on emissions than those currently in place under the Regional Greenhouse Gas Initiative ("RGGI").

Further, the Obama administration has signaled its specific interest in regulating carbon dioxide emissions from coal-fired power plants. On February 17, 2009, EPA Administrator Lisa Jackson announced that EPA is reviewing the Bush Administration's policy determination not to regulate carbon dioxide emissions from such plants. EPA Press Release, "EPA Administrator

Jackson Orders Review of Key Clean Air Documents" (February 17, 2009), *available at* http://yosemite.epa.gov/opa.[10]

In meetings conducted on February 21-23, 2009, Carol Browner, special advisor to the Obama administration on climate and energy, indicated that EPA soon will announce its endangerment finding following on the Supreme Court's mandate in *Massachusetts v. EPA*. *See* Environmental Quality Management, Inc., *Environmental News*, available at http://www.eqm.com/news.html. That finding likely will usher in regulation of greenhouse gas emissions from all sources, including stationary sources like Merrimack Station. According to Administrator Jackson, EPA action on the issue could take place as early April 2009. *Id.*

Most recently, on March 10, 2009, EPA proposed a rule that would require polluters, including electricity generators, pursuant to the Clean Air Act, to report greenhouse gas emissions, with the first annual report due to EPA in 2011 for the calendar year 2010. *See* http://www.epa.gov/climatechange/emissions/ghgrulemaking.html.

3. *Climate protection is a key focus of New Hampshire's energy and environmental policy.*

New Hampshire has developed a clear policy on climate. It passed, in 2002, the Clean Power Act, becoming the first state in the country to pass legislation aimed at reducing carbon dioxide emissions. *See*, Cat Lazaroff, "New Hampshire Passes Nation's First CO2 Cap," Environment News Service (April 22, 2002). New Hampshire passed in 2007 a new state

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[10] On November 13, 2008, the EPA Environmental Appeals Board in *In re Deseret Power Electric Cooperative*, PSD Appeal No. 07-03 (EAB Nov. 13, 2008) rejected, with reference to *Massachusetts v. EPA*, the EPA's reasons for failing to include carbon dioxide controls in a Utah coal-fired power plant's Clean Air Act permit. In response, on December 18, 2008, then EPA Administrator Stephen Johnson issued an interpretive memorandum stating that carbon dioxide is not a regulated pollutant under the Clean Air Act and that therefore EPA's regulations do not require EPA or the states to consider carbon dioxide emissions in issuing Clean Air Act permits. Memorandum from Stephen L. Johnson, Administrator, to Regional Administrators re: EPA's Interpretation of Regulations that Determine Pollutants Covered By Federal Prevention of Significant Deterioration (PSD) Permit Program (December 18, 2008).

renewable electricity standard requiring utilities to generate twenty-five percent of electricity from renewable resources by 2025. RSA 362-F *et seq.* In June, 2008, the State passed legislation implementing RGGI, a mandatory, market-based cap and trade program to reduce carbon dioxide emissions from the power sector ten percent by 2018. *See* RSA 125-O:19-22. Although RGGI is not nearly as stringent as the federal requirements to reduce greenhouse gases likely will be, it demonstrates New Hampshire's continuing commitment to reduce global warming pollution to avoid the devastating consequences of climate change under a business-as-usual scenario. Also in 2008, Governor John Lynch established a Climate Change Task Force charged with developing an action plan for the state. NH Governor Executive Order No. 2007-2 (December 6, 2007). The Climate Change Task Force is expected to set this month a goal of reducing annual carbon dioxide emissions by 80 percent from 1990 levels by 2050. *See*, New Hampshire Climate Change Policy Task Force, New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future—Draft Report, at 7 (January 29, 2009).

B. Pending Federal Mercury Regulations Likely Will Require Removal Efficiencies Greater Than The Scrubber Law Currently Requires.

Southern New Hampshire and northeastern Massachusetts contain one of the five confirmed mercury hotspots in the Northeastern United States and Southeastern Canada. *See*, C.T. Driscoll, *et al.*, Mercury Matters: Linking Mercury Science with Public Policy in the Northeastern United States, Hubbard Brook Research Foundation (2007), Science Links Publication, Vol. 2, no. 3, at 16. In particular, an area of "intense deposition" was found near Concord, New Hampshire. *Id.* The researchers noted that if mercury emissions from four coal-fired power plants were cut by fifty and ninety percent, the "greatest decrease in deposition

would occur near Merrimack Station in Bow, New Hampshire – the largest coal-fired power plant in the study area." *Id.*, at 17.

The Scrubber Project will not entirely abate mercury emissions. Assuming the scrubber achieves eighty percent removal efficiency, Merrimack Station would continue to emit an estimated 27.5 pounds of mercury compounds annually. *See* ISTEPS Power Plants Emissions Data (2007 inventory), at 4, App. at A-66. Moreover, the plant likely would not comply with pending federal mercury regulations.

Federal mercury limits for electric generating units like Merrimack Station will be based on the stringent Maximum Available Control Technology ("MACT") standard. 42 USC § 7412(d). In the past, coal-fired power plants have been able to avoid MACT-based controls for mercury limits. The Clean Air Act generally requires EPA to promulgate regulations implementing MACT-based controls for each listed category of major sources that emit hazardous air pollutants. *Id.* EPA under the Bush administration, however, purported to de-list electric generating units as one of the major source categories, allowing such plants to avoid MACT compliance, and instead regulating those plants under the much less stringent Clean Air Mercury Rule. *Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants from Electric Steam Generating Units from the Section 112(c) List*, 70 Fed. Reg. 15,994 (March 29, 2005), amended and corrected in 70 Fed. Reg. 33,000 (June 7, 2005).

In 2008, the Court of Appeals for the District of Columbia issued a decision in *New Jersey v. EPA*, finding in favor of the states and environmental groups and vacating the Clean Air Mercury Rule and Delisting Rule.[11] 517 F.3d 574 (D.C. Cir.), *mandate issued*, March 14,

[11] In October, 2008, several environmental groups filed a notice of citizen suit against EPA for failure to promulgate MACT-based emissions standards for hazardous air pollutants, including mercury, emitted by coal-fired electric utility steam generating units. *American Nurses Ass'n v. EPA*, Complaint for Declaratory and Injunctive Relief, filed December 18, 2008.

2008, *reh'g en banc denied*, May 20, 2008, *cert. dismissed*, February 6, 2009, *and denied* February 23, 2009. Although the decision was initially appealed by the EPA and industry groups, the EPA subsequently withdrew, on February 6, 2009, its appeal and announced that it would, consistent with the Court of Appeals ruling, develop appropriate MACT standards to regulate power plant emissions of hazardous air pollutants, including mercury.[12] *See* BNA Environment Reporter, "EPA Plans Mercury Rules for Power Plants, Moves to Withdraw Supreme Court Petition," (February 13, 2009).

In January 2009, EPA issued a guidance memorandum indicating that the more stringent mercury MACT provisions of the federal Clean Air Act must be applied retroactively to 2005. Memorandum from Robert J. Meyers, Principal Deputy Assistant Administrator (January 7, 2009).

The imminent federal MACT regulations are anticipated to require removal of ninety to ninety-five percent of mercury emitted from power plants—well in excess of the eighty percent required by the Scrubber Law. *See* 42 U.S.C. § 7412(d)(3) (generally defining the MACT standard for existing sources as at least as stringent as the average emission limitation achieved by the best performing twelve percent of the existing sources), *see* Northeast States for Coordinated Air Use Management, Comments to Docket Number OAR-2002-0056 on Proposed National Emission Standards for Hazardous Air Pollutants; and in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units (June 29, 2004), at 11 (best performing twelve percent of existing sources

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[12] On February 23, 2008, the Supreme Court declined certiorari in *New Jersey v. EPA*, extinguishing the remaining industry appeal of the decision.

remove ninety to ninety-five percent of mercury). As a result, the $457 million Scrubber Project likely will not achieve compliance with federally mandated mercury emissions controls.

C. Merrimack Station's Pending Clean Water Act Permit Likely Will Contain Stricter Limits On Its Water Withdrawal And Discharge.

Merrimack Station will soon be required to comply with a new National Pollutant Discharge Elimination System ("NPDES") permit issued under the Clean Water Act which will likely contain more stringent limits on the plant's operation and effluent. NPDES permits are issued to polluters pursuant to the Clean Water Act to achieve reductions in discharges into the nation's waters. 33 USC § 1342. Merrimack Station's current NPDES permit was issued in 1992 and expired in 1997, and has been administratively continued for nearly twelve years, despite its lack of thermal discharge limits, *see* Permit No. NH0001465 (requiring PSNH merely to operate power spray modules to attempt to limit temperature if certain high temperatures are reached in the Merrimack River), p. 16, and other more protective standards. EPA, however, is in the process of drafting, and plans to issue in this year a new draft NPDES permit for Merrimack Station.

Coal-fired power plants generate considerable amounts of waste heat that must be discharged into the environment in some form. Historically, many such plants discharged the heat by withdrawing from a local water body large amounts of water, known as cooling water, to which the heat is transferred; that cooling water is then discharged at elevated temperatures back into the local water body. When a plant withdraws water from a river, fish can be killed by becoming stuck against the intake structure grates or by being pulled into the plant and being exposed to chemicals and extremely high heat. Additional harmful ecological impacts occur due to the increased temperature of the body of water receiving the cooling water. *See, e.g.,* Brayton Point Information Sheet re Final NPDES Permit, October 2003, *available at*

http://www.epa.gov/region01/braytonpoint (stating, "As a result of Brayton Point Station discharges of heated water, the temperature of the bay is about 1.5 [degrees] Fahrenheit greater than other similar water bodies locally . . . Altering the temperature of the bay has degraded the habitat, making areas inhospitable to native fish species, disrupting normal fish migration, and undermining the balanced community of fish that should exist in Mount Hope Bay.")

Merrimack Station uses this system, taking in and discharging 256 million gallons of water from the Merrimack River *each day*. PSNH Response to EPA's Clean Water § 308 Letter re Merrimack Station (November 2007). PSNH estimates that 2,880,538 fish and fish larvae are killed annually at Merrimack Station by entrainment at the water intake point. *Id.* Merrimack Station currently discharges into the Merrimack River water reaching temperatures in excess of 90 degrees Fahrenheit in the summer. *Id.*

Other electric generating facilities in the region have recently received new NPDES permits, in which EPA has imposed considerably more stringent thermal discharge limitations and required cooling towers, a technology that helps prevent some of the harms associated with the older system used by PSNH, particularly the release of very hot water into a receiving water body. *See, e.g.*, Permit issued to Dominion Energy for Brayton Point Station, Permit No. MA0003654 (October 6, 2003); permit issued to Mirant for Mirant Canal Station, Permit No. MA00004928 (August 1, 2008); permit issued to Mirant for Mirant Kendall Station, Permit No. MA0004898 (December 18, 2008).

EPA has indicated that it may require similar technology at Merrimack Station. In a 2007 information request, EPA required PSNH to evaluate cooling towers. *See* PSNH Response to EPA's CWA § 308 Letter re Merrimack Station (November 2007). Installation of cooling tower technology would have an initial capital cost ranging from an estimated $50 to $100 million,

with annual operating costs estimated at $5 to $10 million. Colburn Compendium at 8, App. at A-26.

D. Viable Alternatives To Continued Operation Of Merrimack Station Exist and Merit Review.

In a recent assessment of Merrimack Station prepared by Synapse Energy Economics, Inc., ("Synapse"), Synapse identified several less expensive and feasible alternatives to Merrimack Station's continued operation, including "purchasing power from the market, energy efficiency savings, conversion of one or both units at Merrimack to burn biomass, the addition of other renewable resources, generating more power at existing power plants in the area, building a new combustion turbine or combined cycle facility at the Merrimack Station site and transmission system upgrades." Synapse, "Initial Report to the New Hampshire Senate Energy, Environment and Economic Development Committee on PSNH's Merrimack Station Scrubber Project," (Mar. 20, 2009), at 6, App. at A-82.

This is not surprising, particularly given that alternatives to traditional carbon-fuel-based energy generation, such as energy efficiency and renewable energy, have advanced rapidly since the passage of the Scrubber Law. Currently, the New England region is expected to have "more than 500 MW of excess capacity, or more than the capacity of Merrimack Station, through 2022." *Id.* at 7, App. at A-83.

A February 2009 study completed for the Commission by GDS Associates found that "there was a potential for cost effective energy efficiency of between 255 MW and 330 MW by 2018, in the state as a whole, and between 184 MW and 330 MW just in PSNH's service area. . . . focus[ing] on savings achievable in the PSNH service area, by 2018 energy efficiency could replace one-half to three-quarters of the capacity supplied by Merrimack . . . look[ing] at the state of New Hampshire as a whole, between one-half and all of the capacity from Merrimack

and between 45 and 85 percent of the energy from the plant, could be replaced by energy efficiency savings." *Id.* at 8-9 (citing GDS Associates, Inc., "Additional Opportunities for Energy Efficiency in New Hampshire," Final Report (January 2009), at 16, App. at A-84-A-85.

Energy efficiency is not only a viable alternative, it is often the least expensive resource available to meet power demand. Data from New Hampshire utilities in 2007 show that the average cost of energy efficiency was 1.9 cents per kilowatt hour, *see* NH Saves, "Core Programs Savings Summary," compared with the current 16 cents per kilowatt hour cost of electricity. *See* http://www.nh.gov/oep/index.htm (March 2009).

Further, several states in the region, including Connecticut, Massachusetts, Maine, and New Hampshire (in 2007), have legislatively mandated that renewable energy will be an increasingly larger portion of their energy portfolios. These policies are beginning to bear fruit. A number of renewable projects are moving forward in the region, and two new renewable energy projects located in New Hampshire, a 100 megawatt wind project in Coos County and a 41 megawatt biomass plant, also in Coos County, recently have submitted transmission interconnection requests to ISO New England.

The availability of lower cost alternatives to continuing to spend hundreds of millions of dollars to extend the life of the decades old, aging coal-fired Merrimack Station power plant warrant the Commission's serious consideration and review.

CONCLUSION

The Commission has the authority—and the obligation, given the Scrubber Project cost increase, related MK2 capacity expansion cost, and other costs soon to be incurred to continue operations at Merrimack Station—to review the Scrubber Project now. Hanging in the balance is nothing less than New Hampshire's energy and environmental future. The Court should order the Commission to review the Scrubber Project and independently determine, in light of the costs, including anticipated environmental compliance costs, and taking into account feasible alternatives, whether it remains in the public interest for PSNH to proceed with the Scrubber Project.

REQUEST FOR ORAL ARGUMENT

Amici respectfully request oral argument. Oral argument from the *amici* would likely be helpful to the court due to the complexity of the issues (particularly factually) in the case at bar, the far-reaching implications of the Commission's decision, and the *amici's* unique understanding of those implications (particularly environmental). *Amici* estimate that 15 minutes will be sufficient. Melissa Hoffer, Esq., will argue for the *amici.*

Respectfully Submitted,

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CERTIFICATE OF CONSENT TO AMICI BRIEF

We hereby certify that, pursuant to Supreme Court Rule 30, we have obtained the consent of the parties to this action to file the instant *amici* brief.

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to New Hampshire Supreme Court Rule 16(10), I hereby certify that two copies of the within Brief were sent by first class mail this 23rd day of March, 2009 to Edward A. Haffer, Esq., counsel for Stonyfield Farm, Inc., H & L Instruments, LLC and Great American Dining, Inc.; Robert Bersak, Esq., counsel for Public Service Company of New Hampshire; Meredith Hatfield, Esq., counsel for Office of Consumer Advocate; and, F. Anne Ross, Esq., counsel for the New Hampshire Public Utilities Commission.

Respectfully submitted,

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The Northeast Utilities System

Robert A. Bersak
Assistant Secretary and
Assistant General Counsel

February 20, 2009
Via E-Mail

To: *Service List, Docket No. DE 08-145,*
Petition of Freedom Logistics, LLC and Halifax-American Energy Company, LLC

Re: *Responses to Tech Session Questions*

Attached please find PSNH's responses to the five questions posed during the February 3, 2009, Technical Session in this proceeding.

Sincerely,

Robert A. Bersak
Assistant Secretary and
Assistant General Counsel

Public Service Company of New Hampshire
Docket No. DE 08-145

Data Request TS-01

Dated: 02/03/2009
Q-STAFF-001
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Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Please provide the total cost and components of the turbine project.

Response:
The total cost of the turbine project is $11.4 million. The Contractor may be entitled to a performance payment upon final performance testing.

The turbine components included the HP/IP rotor with integral shroud rotating blading, integral shroud stationary blading, nozzle block, inner and outer cylinder casings, associated seals and piping, inspection ports.

Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Please provide a listing of work done at Merrimack Unit 2 during the turbine outage, separated into capital and O&M.

Response:
In April and May 2008, Merrimack Unit 2 underwent its scheduled major unit inspection outage. The outage began on April 1 and ended on May 22 lasting just under 52 days. Capitalized projects and major operations and maintenance work completed during the outage are listed below. There were also numerous other corrective and preventative tasks performed throughout the unit.

Capitalized Projects

HP/IP turbine replacement:
Installation of a new HP/IP turbine including the HP/IP rotor, stationary blade rings, and inner and outer cylinder casings.

Generator rotor replacement:
Completed the replacement of the generator. This replacement incorporated improved design features and allowed for a shorter outage duration.

Air heater tube replacement:
The tubular air heater had been on a multi-year replacement program. The hot-end air heater replacement of the tubes began in 2007. The remaining tubes were installed during this outage.

Boiler floor replacement:
The boiler floor replacement project involved the replacement of the boiler floor sections, supports and headers.

Selective catalytic reducer (SCR) catalyst replacement:
The SCR was installed on the unit in 1995. The 4 catalyst layers are on a replacement schedule to maintain optimum NOx reductions. Layer 4 of the catalyst was replaced during the outage. This effort included vacuuming, sampling, thermocouples, staging removal, and demobilization.

Secondary superheater (SSH) inlet bank replacement:
During prior inspections 23 pendants in the SSH inlet tube bank were identified with reduced tube wall thickness, typical in this area of the boiler caused by ash erosion and corrosion. The replacement of pendants involved removing a side wall section to remove and replace the (23) pendant sections in the most cost effective manner.

Ash conditioning equipment:
Ash conditioning equipment was installed on an existing flyash storage tank. This conditioning equipment will provide the option for either dry or wet loading of flyash into the tanks.

Station batteries relocation and replacement:
Station batteries are required safety equipment to provide stand-alone power to critical systems such as emergency lighting and the several emergency pumps. The batteries were installed in a dedicated battery room with a forced ventilation system consistent with good industry practice.

Excitation switchgear voltage regulator replacement:
The older analog components were replaced with new digital components which have self diagnostics and more readily available spare parts.

Sootblowers removal and replacement:
Sootblower maintenance and replacement is an on-going annual outage effort. During this outage 13 sootblowers and associated supporting equipment were replaced.

Selective catalytic reducer sub-girt, insulation and lagging replacement for duct DO4C:
To eliminate a potential safety hazard, an area of the SCR duct had sub-girt, insulation and lagging replaced.

Computer System: Replaced the distributed control system (DCS) system.

Primary Superheater (PSH) Bypass Valve: Replaced the 202 PSH bypass control valves.

Secondary Superheater (SSH) Bypass Valve: Replaced the 207 SSH bypass valve.

Main boiler feed pump (MBFP) control valve: Replaced the MBFP FCV 5 control valve.

SCR Expansion Joints: Replaced a number of SCR expansion joints consistent with the expansion joint program.

Coal Bunker Gates: Replaced E, F & G coal bunker gates.

Projects Charged to Operation and Maintenance

Boiler Maintenance

- Cyclones pin replacement and refractory installation: 468,000 pin studs were installed and refractory was applied by hand (ramming) to the slag necks and sprayed into the boiler floor section.

- Secondary superheater inlet / intermediate / outlet alignment checks and shield repair / replacement: Additional boiler tube maintenance included vacuuming the furnace area, inspections, alignments, shield repairs, and selected replacements.

- Vertical reheat superheater (VRSH) inspection of OXI stop and installation of additional OXI stop: 693 of 1207 VRSH tube shields were removed and areas sandblasted in order to apply the erosion inhibitor Oxi-Stop, as needed.

- Air heater wall tie replacement: Sixteen wall ties that extend from north to south on the hot side of the air heater were replaced. In addition, tie supports were installed in two places from east to west to keep the ties in place.

- Penthouse Inspection and repairs of refractory walls: An inspection was performed and found the boiler penthouse was in good condition with only 1-2 inches of ash buildup, confirming the 2007 repairs were successful. The refractory walls were also inspected and in general found to be in good shape. Incidental repairs of the refractory wall were made as necessary.

Nondestructive examinations of the boiler: A variety of inspection and non-destructive testing was performed throughout the boiler.

Other Balance of Plant Maintenance

Stack maintenance: The inner stack liner was washed and inspected. Repairs were made as needed.

Precipitator: Repairs were made to the precipitator box casing, and the new and old precipitators, ducts, hopper rooms and gutter system were vacuumed and inspected.

Miscellaneous planned maintenance work included valve inspection and repair, the corrosion fatigue inspection program, and general system maintenance.

Public Service Company of New Hampshire
Docket No. DE 08-145

Data Request TS-01

Dated: 02/03/2009
Q-STAFF-003
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Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Was the cost of any of the work performed during the turbine outage included in the budgeted cost for the scrubber or was the cost of the turbine work separate from the scrubber budget?

Response:
The turbine outage work was not included in the budgeted cost for the scrubber. The turbine work has always been a discrete project with its own budget.

Public Service Company of New Hampshire
Docket No. DE 08-145

Data Request TS-01

Dated: 02/03/2009
Q-STAFF-004
Page 1 of 1

Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Please provide the net book value of Merrimack Unit 2 as of April 30, 2008.

Response:
PSNH closes its books on a quarterly basis, so it does not have a net book value for Merrimack Unit 2 as of April 30, 2008. Moreover, because Merrimack Station is a multi-unit station, information on the cost of Unit 2 alone excludes the cost of common facilities used at both units. The cost of common facilities is not allocated to each unit.

Therefore, PSNH is providing information on the net book value of Merrimack Station Units 1 and 2, plus common facilities, as of December 31, 2008 (the date of the most recent closing). The net book value as of that date is $92,074,046.

Public Service Company of New Hampshire
Docket No. DE 08-145

Data Request TS-01

Dated: 02/03/2009
Q-STAFF-005
Page 1 of 1

Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
What is the salvage value for old turbine?

Response:
The old turbine was sold as scrap metal for a value of $34,745.

Public Service
of New Hampshire

The Northeast Utilities System

June 7, 2006

Mr. Robert R. Scott, Director
Air Resources Division
NH Dept of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Public Service Company of New Hampshire
Merrimack Station – Scrubber Project
2008 Merrimack Unit #2 Outage

Dear Mr. Scott,

This correspondence is a follow-up to discussions held on May 16, 2005 between representatives of Public Service of New Hampshire (PSNH) and NH Department of Environmental Services, Air Resources Division (DES), specifically Craig Wright, Michele Andy, Gary Milbury, and Jeff Underhill of DES and Bill Smagula, Lynn Tillotson, and Laurel Brown of PSNH.

Engineering Study and Assessment

As discussed at the May 16, 2006 meeting, PSNH is preparing for the installation of a scrubber at Merrimack Station. As required by the recently enacted House Bill 1673-FN, a scrubber must be installed and operational at Merrimack Station no later than July 1, 2013. In anticipation of a statutory requirement, PSNH retained Sargent & Lundy to complete a comprehensive, multi-phased engineering study to evaluate multi-pollutant control technology options for the Merrimack Station and to identify the most cost effective and operationally feasible option for mercury control as well as potential challenges. This evaluation included an assessment of the boiler, balance of plant equipment, turbine-generator systems, and site work. This assessment was done to ensure the existing station equipment will perform reliably and the unit's cost will remain competitive since the large investment necessary to install a scrubber necessitates the continued operation of Merrimack Unit #2 (MK2) well beyond 2013. Lastly, to maintain the generation output and value to customers, the large power consumption of a scrubber system – as much as 6 to 10 megawatts, justified the need to fully assess balance of plant improvements necessary to offset the additional load.

Phase I of this study confirmed that the installation and operation of a scrubber at Merrimack Station is a viable option that will result in reductions in mercury and sulfur dioxide (SO_2) emissions. However, the installation of a scrubber will require a new stack, material storage and handling system, wastewater treatment system, balance of plant work, MK2 high pressure/intermediate pressure (HP/IP) turbine and generator work, in addition to the installation of the scrubber vessel.

Planned Maintenance Outages

In order to meet the July 2013 deadline, it will be necessary for PSNH to complete as much of the balance of plant work as possible during planned maintenance outages in the years preceding 2013. This will require careful planning and coordination given Merrimack Station's anticipated outage schedules. Planned maintenance outages occur on MK2 every year. PSNH typically performs annual maintenance on MK2 in the spring to prepare for the higher summer demand periods; while maintenance on MK1 is completed in the fall. The length of a particular outage varies depending on the scope of work being completed and whether or not it is a "major" outage. A "major" outage, when turbine and/or generator work is done, may last 8 to 10 weeks. Routine turbine maintenance and generator inspections, as well as routine generator maintenance, are completed every 5 years. The next major outage on MK2 is scheduled for 2008, and then again in 2013.

Regulatory Review

Prior to 2002, maintenance outage work had been scheduled, budgeted, and completed without regulatory review by DES. Beginning in 2002, PSNH began meeting with representatives of DES, at their request, to discuss capital maintenance projects scheduled to be completed during each planned maintenance outage at Merrimack Station. Following this approach, the individual projects identified as necessary by Sargent & Lundy would be included in the review conducted immediately prior to the outage during which the work is scheduled to be completed. However, due to long lead time for equipment delivery and the need to complete the work during the next planned major outage, two projects – the MK2 HP/IP turbine and generator work – warrant immediate discussion and review.

Balance of Plant Projects Summary

The MK2 HP/IP project entails the replacement of one steam turbine rotating element and stationary blades with functionally equivalent components. In order to maintain MK2's generation output capability, the new blades will be energy efficient blades and of a more reliable design. These blades are designed for maximum efficiency using three-dimensional flow analysis to optimize the steam turbine design. State of the art blade tip seals will provide additional efficiency improvements. The HP/IP rotor, stationary blade rings and inner cylinder casing will be replaced. The outer cylinder casing may also be replaced.

The associated generator repair work involves the removal of cracks in the tooth-tops of the rotor, where retaining rings are shrunk onto the rotor to hold copper bars in place. Once the cracks are removed by grinding, a long retaining ring assembly with new, larger retaining rings will be used to re-assemble the generator rotor. The generator field winding must be rewound with new copper coils as part of this repair.

Following the completion of the HP/IP turbine and generator work, PSNH will be operating MK2 at the same fuel flow and emissions levels as it was operated prior to this equipment being repaired and/or replaced. The HP/IP turbine work will not change the amount of coal burned. Normal full load steam inlet conditions for flow, pressure and temperature will also be held constant, while producing an expected 6 to 13 additional megawatts. Because the coal flow remains constant, air emissions will not change or increase as a result of these projects.

Completion of the MK2 HP/IP turbine and generator projects is expected to maintain the reliability and output of MK2, and allow for the operation of a scrubber. Although the total combined cost of these two projects is estimated to be $9M – $15M, much of the budgeted expense is associated with the routine disassembly, inspection, and reassembly of both the high speed rotating equipment and the generator. The replacement of the HP/IP turbine work is being done as a lower cost option to expensive, more frequent, and time consuming repairs.

Anticipated Schedule

PSNH has identified the next major outage, in 2008, as the appropriate outage to complete the MK2 HP/IP turbine and generator maintenance. Completion of these two projects during the 2008 outage will allow PSNH to complete the necessary maintenance and balance of plant work in time to allow for the operation of the scrubber prior to June 2013. Completion of this work during 2008 will reduce the construction crews on site, eliminate conflicts with the construction of the scrubber system, and be more manageable for Merrimack Station resources.

In order to complete the MK2 HP/IP turbine and generator maintenance during the spring 2008 outage, PSNH will have to place an order for equipment by July 2006. The lead time required for equipment delivery is approximately 2 years. Traditionally, PSNH has placed orders for equipment prior to regulatory review; however, PSNH is proceeding cautiously in order to manage risks associated with the scrubber project (due entirely to the magnitude of the project) and balance of plant work (due to the cost of the HP/IP turbine and generator maintenance work).

Approach for Expedited Review

As previously stated, the HP/IP turbine and generator work will not result in an increase in emissions. As part of the scrubber project, emissions of mercury and sulfur dioxide will be reduced significantly when the scrubber becomes operational. These projects are maintenance activities that are routinely performed throughout the industry and are necessary to maintain

turbine and system efficiencies and reliability and, therefore, are not major modifications subject to Prevention of Significant Deterioration/New Source Review (PSD/NSR) permitting requirements. PSNH acknowledges that the issue of routine and non-routine physical changes is among the PSD/NSR applicability issues that continue to be debated at a national level and that a resolution of the issues may be years away. In order to satisfy the MK2 2008 outage work and schedule, PSNH has chosen an approach for the HP/IP turbine and generator projects that will expedite the regulatory review and does not require PSNH and DES to reach a resolution relative to the routine or non-routine nature of these projects. Due to the reasons stated previously, it would not be in the best interest of PSNH or PSNH customers to delay the regulatory review and completion of the HP/IP turbine and generator work.

In order to expedite the discussion and review process, PSNH has agreed to establish "baseline" emissions and substantiate "representative actual annual emissions" for Merrimack Station. Based on previous discussions with DES, it is our understanding that this approach allows an "actual" to "representative actual annual emissions" test for the purposes of quantifying an emissions increase and, therefore, eliminates the necessity for a NSR/PSD applicability determination. PSNH accepts this "actual to representative actual annual emissions" approach as a means of documenting its position that there will be no increase in emissions as a result of the HP/IP turbine and generator projects at Merrimack Station.

As discussed at the May 16th meeting, PSNH requests that DES concur, in writing, with this "actual" to "representative actual annual emissions" approach. With DES agreement of this approach, PSNH will provide the necessary documentation prior to the MK2 2008 planned maintenance outage, including a baseline determination, representative actual annual emissions, and supporting data to define normal source operations, if necessary.

If you would like to discuss the HP/IP turbine and generator work, or the approach outlined above, please contact me at 634-2851.

Sincerely,

William H. Smagula, P.E.
Director – Generation

cc: Craig A. Wright, DES ARD

Public Service
of New Hampshire

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(603) 634-2236
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The Northeast Utilities System

John M. MacDonald
Vice President - Energy Delivery and Generation

January 31, 2008

Mr. Robert R. Scott, Director
Air Resources Division
NH Dept. of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Public Service Company of New Hampshire
Merrimack Station – Clean Air Project
2008 Merrimack Unit #2 Outage

Dear Mr. Scott:

In response to your letter dated June 12, 2006, Public Service Company of New Hampshire submits baseline emissions data and projected actual emissions data for Merrimack Unit #2 (MK2). This submittal is being made as part of an approach, agreed upon by PSNH and the Department of Environmental Services, Air Resources Division (DES), to allow for an expedited regulatory review of balance of plant projects planned to be completed during MK2's 2008 outage. As requested, the emissions data provided in Attachment 1 is being submitted 60 days prior to the upcoming MK2 outage scheduled to begin on April 1, 2008. Please note, while this project has been generally referred to as the scrubber project during its young life, PSNH has adopted the name, The Clean Air Project, as its formal description. We will endeavor to use this new name going forward.

Project Overview

As indicated in my letter to you dated June 7, 2006, the balance of plant projects planned to be completed during the 2008 MK2 outage, including the HP/IP project and associated generator repair work, are necessary in order to maintain the output of MK2 and comply with RSA 125-O:13 which requires PSNH to install a wet scrubber at Merrimack Station, no later than July 2013. Given the large power consumption of the proposed scrubber system, the completion of this energy efficiency project is vital to Merrimack Station's long term operation.

The HP/IP project involves the replacement of one of the six steam turbine components with a functionally equivalent component. The new, state of the art turbine blades will be energy

efficient. As part of this project, the HP/IP rotor, stationary blade rings, and inner and outer cylinder casings will be replaced. The repair work to the generator involves an in-kind replacement of the generator rotor. The replacement of the generator rotor is the most cost effective approach to repairing the generator and is being completed as an alternate to the previously proposed repair approach which included installation of a long retaining ring assembly, rewinding with new copper coils, etc. The replacement of the generator requires a shorter critical-path outage duration and eliminates unknowns and risks associated with repair work.

Merrimack Unit #2 Operation

Merrimack Station is PSNH's prime base load electric generating station currently produces approximately 475 net megawatts of electricity, 321.75[1] of which is produced by MK2. Following the completion of the MK2 HP/IP turbine project and associated generator work MK2 is expected, per the contract guarantee, to produce an additional 6.5 megawatts of electricity. The actual net unit output will range between 6 and 13 megawatts – an increase that is necessary to support the large power consumption of the future, new scrubber system –due to the increased efficiency of the turbine blades. As a result of this energy efficiency project, MK2 will produce more energy without increasing fuel consumed.

Following the completion of the HP/IP turbine project and associated generator work, MK2 will be operated at the same fuel flow rates and emissions levels as it was operated prior to the MK2 2008 outage. Normal full load steam inlet conditions for flow, pressure and temperature will remain at their previous values. Because the coal flow will remain constant, there is no change or increase in air emissions associated with the HP/IP turbine and generator project.

Given the base load operation of Merrimack Station, PSNH anticipates that actual annual emissions from MK2 in the future will be very similar to historical emissions. A review of historical data for the period 1996 through 2007 reveals slight variability in MK2's annual average capacity factor, operating hours, and total fuel burned, largely the result of annual maintenance outage schedules which typically range between four and nine weeks and unplanned outages. Historical data is enclosed as Attachment 2.

Regulatory Review

The approach proposed by PSNH for regulatory review is based on EPA guidance documents, specifically those applicable to Detroit Edison's Monroe Power Plant and Otter Tail Power's Coyote Station where similar projects have been undertaken. The proposed approach is also based on existing federal PSD regulations which allow electric utilities to determine applicability using projected actual emissions. This approach, which has previously been called the "actual-to-representative-actual-annual" emissions test, allows utilities to compare projected future

[1] MK2's current winter claimed capability.

annual emissions that will occur following a non-routine physical or operational change to actual baseline emissions preceding the change. Baseline emissions, calculated using utilization rate, fuel use and applicable emission factors, are based on an average annual emissions rate in tons per year for each pollutant emitted. Projected actual emissions are based on the maximum annual rate, in tons per year, at which a regulated PSD pollutant is projected to be emitted, less any emissions that could have been accommodated during the baseline period and are not related to the change. The proposed approach allows PSNH to document that there is no emissions increase associated with the MK2 HP/IP turbine and generator project.

Baseline Emissions

PSNH understands that baseline is calculated based on the average emissions, representative of normal operation, during 2 consecutive years during the previous 5 year period. PSNH has calculated baseline emissions for MK2 based on the annual average of emissions during two consecutive calendar years, or twenty-four consecutive months, preceding the 2008 outage, specifically 2006-2007. In addition to the enclosed historical data, summaries of emissions for the previous 5 years (2003-2007) as well as baseline for TSP, CO, VOCs, SO2, and NOx are provided in Attachment 2. The baseline for NOx and SO2 was calculated using emissions data contained in PSNH's Quarterly Emissions Inventory Reports, as previously filed with DES and the NH Public Utilities Commission. Copies of these reports for the years 2006-2007 are also enclosed in Attachment 3. Baseline emissions for CO and VOCs were calculated using AP42 emissions factors published by DES and available on its web site. Baseline emissions for PM were calculated using the emissions rate documented during the most recent stack test. These calculations are identical to those used in PSNH's annual emissions reports and emissions based fees.

Projected Actual Emissions

Projected actual emissions for 2008 and 2009 have been calculated using forecasted annual capacity factors, fuel use, hours of operation and emissions rates. Projected emissions for 2008 are based on the average for the previous 5-year period, while projected emissions for 2009 are based on hours of operation, fuel use, and emissions similar to 2006. As previously stated, given the base load operation of Merrimack Station, PSNH anticipates that MK2's projected actual emissions will be comparable to its historical actual emissions. Projected actual emissions and forecasted capacity factors for MK2 are enclosed in Attachment 1. Historic capacity factors are contained in Attachments 1 and 2. In accordance with EPA guidance, the projection of post-change emissions does not include the portion of emissions that could have been accommodated before the change and is unrelated to the change. See letter from Francis X. Lyons, Regional Administrator, US EPA, to Henry Nickel, Counsel for the Detroit Edison Company, Hunton & Williams, dated May 23, 2000. Maximum potential emissions (i.e., emissions that can be accommodated prior to the change) currently allowed under TP-B-0462 and existing state and federal applicable requirements are contained in Attachment 4.

Future Recordkeeping and Reporting

As specified under 40 CFR 52.21(b)(21)(v) and 40 CFR 52.24(f)(13)(v), PSNH will maintain and submit to DES, on an annual basis for a period of 5 years, information demonstrating that there are no emissions increases as a result of the HP/IP turbine and generator project. This information may include annual utilization data, emissions data, fuel use, etc. PSNH may exclude emissions increases that are caused by other factors including, for example, increases associated with variability in control technology operation and performance or coal characteristics. Emissions increases may also exclude increases associated with increased use of MK2 due to the growth in electrical demand for the utility system as a whole since the baseline period. See Detroit Edison Applicability Determination Detailed Analysis, dated May 23, 2000.

In addition to documenting that there is no increase in emissions associated with the HP/IP turbine and generator project, the enclosed baseline and projected actual emissions fulfills the request for documentation contained in your letter dated June 12, 2007. Should you have any questions or require additional information relative to the MK2 HP/IP turbine and generator project or the enclosed data, please contact me at 634-2851 or Laurel L. Brown, Senior Environmental Analyst, at 634-2331.

Sincerely,

William H. Smagula, P.E.
Director – Generation

Enclosures

cc. Thomas S. Burack, Commissioner, DES
Harold E. Keyes, PSNH Merrimack Station

Compendium of Concerns Regarding the Proposed Installation of a Scrubber at PSNH's Merrimack Station in Bow, New Hampshire

Prepared for the
Commercial Ratepayers Group

Principal Author
Kenneth A. Colburn
Symbiotic Strategies, LLC

December 11, 2008
(Revised January 5, 2009)

The discussion and costs reported herein reflect a brief initial assessment that should be improved with additional time and analytical resources; additional or more accurate information and/or suggestions for improvement are welcome. This assessment is intended simply to demonstrate that a thorough, comprehensive investigation of several significant, as-yet-unaddressed issues should be developed and carefully considered by policymakers before ratepayers are committed to the long-term costs and impacts likely to result from the installation of the scrubber at, and ongoing operation of, Merrimack Station.

Revision History

Original version released December 11, 2008.

Revision 2 released on December 19, 2008 included these changes:

1. Mercury control costs for activated carbon injection and TOXECON technology revised per Institute of Clean Air Companies (ICAC) January 3, 2005 comment letter in USEPA Docket ID No. OAR-2002-0056 and personal communication.
2. New section added on Jobs and Labor Opportunities Associated with Energy Alternatives (IV.F.).

Revision 3 released on January 5, 2009 included these changes:

1. References to (a) Center for American Progress / Political Economy Research Institute study and (b) Gittell Magnusson study on economic impacts of Regional Greenhouse Gas Initiative (RGGI) to New Hampshire added to Section IV.F. on Jobs and Labor Opportunities Associated with Energy Alternatives; section reordered.

Compendium of Concerns Regarding the Proposed Installation of a Scrubber at PSNH's Merrimack Station in Bow, NH

Principal Author
Kenneth A. Colburn
Symbiotic Strategies, LLC

I. Overview

Reducing mercury emissions is important for both public health and the environment, and in 2006 the Legislature mandated that PSNH install wet flue gas desulphurization ("scrubber") technology at its coal-fired Merrimack Station in Bow to reduce mercury emissions by 80%. At the expected cost of $250 million and given what we knew then, that was the right decision. Much has changed, however, and this brief initial analysis indicates that PSNH's proposed installation of the scrubber and continued operation of Merrimack Station could leave ratepayers exposed to billions of dollars in potential additional costs for carbon, mercury, cooling water systems, fuel costs, construction cost increases, etc. – ***in addition to*** the now $457 million nominal cost of the scrubber project estimated by PSNH. Applying a simple ratio based on PSNH's indication that the scrubber project would cause a 0.33¢ per kWh rate impact, the table below shows that overall as-yet-unaccounted-for future rate impacts can be expected to be several times greater. Increasing fuel costs over time are not included in this table, and are likely to further exacerbate ratepayer impacts, particularly as compared to energy efficiency and some renewable energy alternatives.

	PSNH Calculation	**High Cost Scenario**	**Low Cost Scenario**
Scrubber Cost	$457,000,000	$457,000,000	$457,000,000
Additional Costs	$0	$2,482,325,815	$852,875,744
Total Costs	**$457,000,000**	**$2,939,325,815**	**$1,309,875,744**
Scrubber Rate Impact	0.33¢ per kWh	0.33¢ per kWh	0.33¢ per kWh
Additional Rate Impacts	n/a	1.79¢ per kWh	0.62¢ per kWh
Total Rate Impact	**0.33¢ per kWh**	**2.12¢ per kWh**	**0.95¢ per kWh**
Multiple of PSNH's Rate Impact Estimate	**n/a**	**6.4**	**2.9**

The magnitude of these potential costs associated with installing the scrubber and continuing to operate Merrimack Station for at least 15-20 more years require a thorough investigation by the NH Public Utilities Commission to determine whether PSNH's proposal represents the best path forward for ratepayers and for the state as a whole. At this time no analysis has been performed of PSNH's revised cost estimate (which increased the estimate from $250 million to $457 million).

> *"Prudent viewers can already see that within the next half dozen years, there are likely to be radical changes in construction costs, operating*

costs, expected sales-volumes, competitive alternatives and price resistance from smart or desperate customers. These concerns call into question whether large investments in coal-generation without carbon controls are reasonable in today's industry…. [These] are the concerns that investment analysts should address before, rather than after, commitments for investment in new coal-fired generation are made."

(Michael Dworkin, former Chair of the Vermont Public Service Commission, and Director of the Institute for Energy and the Environment at Vermont Law School, 2008)

II. Background

A. Merrimack Station is PSNH's prime base load plant (see http://www.psnh.com/AboutPSNH/CompanyProfile/Merrimack.asp):

1. 478 MW output
2. Supplies 189,000 residential, commercial and industrial customers; PSNH serves 490,000 total customers
3. Began commercial operation in 1968
4. Operates on two coal-fired steam turbines, and two combustion turbines utilized only during great power demands
5. Annual emissions (PSNH 2007 data, EPA EGrid 2005 and TRI 2006 data); other pollutants include Carbon Monoxide, Volatile Organic Compounds, Ammonia, Particulate Matter, and several toxic compounds:

Pollutant	Emissions	Units
Carbon Dioxide	3,726,216	Short Tons
GHGs Overall	3,398,027	Metric Tonnes CO_2 Equivalent
Sulfur Dioxide (SO_2)	36,504	Short Tons
Nitrogen Oxides (NOx)	3,219	Short Tons
Mercury Compounds	137.64	Pounds (2007 ISTEPS estimate)
Mercury	19.08	Pounds (2005 EGrid)

B. PSNH has announced that it expects to spend $457 million of ratepayers' money – an 83% increase over its original cost estimate of $250 million – to install a scrubber at its 40-year-old coal-fired Merrimack Station. Reducing mercury emissions is important for both public health and the environment. The scrubber installation was mandated by the Legislature in 2006 and would reduce mercury emissions by 80%. In 2006, at a $250 million cost and given what we knew then, that was the right decision. Now, amid an unprecedented global economic meltdown, increasing constraints on carbon dioxide emissions and a rapidly increasing array of alternatives, we should take a hard look to make sure this is still the right deal for ratepayers, New Hampshire and the environment. It all boils down to the question: Is this is a good investment? If PSNH's customers are going to invest nearly a half-billion dollars, should that investment be used to continue operating a 40-year old coal plant that will still emit mercury, carbon dioxide and other harmful air pollutants? That will still require substantial additional investment for environmental controls for both air and water pollution? Are there alternatives, and if so, shouldn't viable alternatives be assessed to better inform this important decision?

III. Concerns About Unexamined Costs and Risks of the Scrubber Installation

A. Control of Carbon Dioxide and Other Greenhouse Gas (GHG) Emissions

1. Urgent Need to Control GHG Emissions

a. In order to avoid climate change impacts, Annex 1 (developed) countries must reduce GHG emissions by 25-40% by 2020. The technology for carbon capture and storage of emissions from coal fired power stations is not expected to be available on an economically viable commercial scale by 2020. (IPCC, 2007)

b. Rather than declining, global GHG emissions are currently accelerating. The IPCC "worst case" development scenario reflects a lower-emissions path than we are actually experiencing. Further, where IPCC (2007) suggested that atmospheric concentrations of GHGs (CO2-equivalent) needed to remain at ~450 parts-per-million by volume (ppm) in order to avoid dangerous man-made interference with the climate system, several scientists now believe that the correct level is ~350 ppm – which is actually *below* current atmospheric concentrations of ~388 ppm.

c. The New Hampshire Governor's Climate Change Task Force has set a goal of reducing CO_2 emissions by 75-80% by 2050. New Hampshire has also committed to the "25 x '25" vision, which aims to have America's farms, forests and ranches provide 25 percent of the total energy consumed in the United States by 2025. The New England Governors and Eastern Canadian Premiers committed in 2001 to reducing GHG emissions too 1990 levels by 2010, 10% below that level by 2020, and 75% below by 2050.

2. Coal Plant Proposals Must Consider Carbon Emissions

a. On April 2, 2007, the US Supreme Court determined in *Massachusetts v. EPA* that carbon dioxide was a pollutant. Resulting uncertainty over future carbon regulations has contributed to coal power plant delays and cancellations across the country. Since late 2006, more than twenty proposed coal-fired power plants have been cancelled. More than three dozen others have been delayed. State regulatory commissions in Oregon, Florida, North Carolina, Oklahoma and Washington State have rejected proposed power plants. The State of Kansas has rejected permits for two 700 MW coal-fired power plants. (Synapse Energy Economics, AMP Report, 2008)

b. The November 2008 decision by EPA's Environmental Appeals Board to remand a Deseret (Utah) power plant proposal could affect all plant modifications having CO_2 impacts, potentially including Merrimack Station's scrubber proposal. Costs associated with Best Available Control Technology (BACT) requirements for CO_2 have not been assessed and the administrative process for determining BACT could cause significant permitting delays.

3. Uncertainty About Future Federal Carbon Controls

a. Substantial uncertainty currently exists about the nature and costs of future federal carbon controls on power plants, including the level of stringency, timing (when such a program will take effect), emissions allowance allocation and prices (e.g., the degree to which allowances are

auctioned or allocated freely), and whether and to what degree emissions "offsets" are allowed.

b. Offsets, if allowed by a federal carbon control program, would likely reflect energy and/or environmental improvements made elsewhere instead of in New Hampshire.

c. President-Elect Obama has committed to embark on a path targeting nationwide GHG reductions to 1990 emission levels by 2020 and an 80% reduction by 2050.

4. Regional Greenhouse Gas Initiative (RGGI)

a. PSNH is already subject to some degree of carbon regulation through NH's participation in the RGGI program. Under this program, PSNH's CO_2 emissions are capped (albeit at a reasonably high level) from 2009-2014, and from 2015-2018 the cap declines by 2.5% per year for an overall 10% nominal reduction by 2019.

b. Most RGGI states have decided to auction 100% of allowances, so the costs for RGGI allowances going forward cannot be known. The initial auction in September 2008 cleared at $3.07/short ton. Credible sources (e.g., Innovest) estimate costs of $7.00/short ton as the program matures.

c. Merrimack Station represents about 47.5% (2007) of total power sector CO_2 emissions in New Hampshire. PSNH has included $15.4 million in its proposed 2009 energy service rate to meet RGGI compliance costs.

d. PSNH also appears to have already factored the costs of RGGI compliance into its calculations of the rate impacts of the scrubber. For example, in its September 2, 2008 filing spreadsheet, "Existing Plant with Capital Adds, Emissions Costs" for 2013 are listed as $32,414,996. This exceeds its previous NO_x/SO_2 emissions costs (e.g., $22,920,000 in 2007) by approximately $10,000,000. This appears roughly consistent with Merrimack Station's annual emissions of CO_2 of 3.7 million short tons multiplied by the initial RGGI auction price of $3.07.

e. It is not clear if or how PSNH may have factored in the fact that it could potentially receive an amount (the exact amount has not yet been determined by the New Hampshire Department of Environmental Services (NHDES)) of free CO_2 allowances under NH's RGGI implementation. This amount could range from 5 to 12 million tons, which would translate to between ~1.4–3.4 years of cost-free RGGI compliance. The more tons of allowances that NHDES grants to PSNH, the less its CO_2 emissions will be reduced. Over the long term, however, even the best-case scenario for PSNH (i.e., receiving 12 million allowances free from NHDES) makes little difference in this analysis. Against billions of dollars in carbon costs to ratepayers, this would reduce PSNH's costs by only ~$77,643,506 at $7.00 per short ton, or only ~$34,052,224 at $3.07 per short ton (2013 present values).

5. Carbon Capture and Storage (CCS) is Unlikely to Figure in Merrimack Station's Future

a. Commercial scale CCS is unlikely to be available until the 2030 timeframe.

b. CCS will result in significant energy penalties.

c. Merrimack Station will likely be at the end of any CCS transportation and storage infrastructure development (e.g., CO_2 pipelines).

d. McKinsey and Synapse both estimate that CCS would increase power costs by two-thirds or more.

6. Consideration of Adaptation Issues and Costs

a. Public interest determinations approving increased GHG emissions are likely to lead to requirements for greater public and private expenditures for adaptation as the climate changes.

b. The UK Stern Review suggested climate impacts will be ~5-10 times more costly to global GDP than mitigation costs.

c. The Governor's Climate Change Task Force Report will include adaptation recommendations to mitigate the effects of climate change, continuing to operate coal-fired power plants will make such adaptation efforts more expensive over the long term.

7. Costs: RGGI is only a modest first step to reduce carbon emissions; far more stringent carbon controls are anticipated under a future federal program. Synapse expects that carbon allowance prices will range between $15-45 per metric tonne of CO_2 equivalent ($MTCO_2e$); Innovest's estimates are slightly higher. These values are consistent with prices already seen in the European Union Emissions Trading Scheme (EU ETS).

A rough estimate of potential carbon control costs for Merrimack Station at these allowance prices is shown below.

Rough Present Value (PV) Cost Estimates for Carbon Allowances	
At 2013, for 2013-2030 period, discount rate of 5%, and 100% auctioning	
High Carbon Price - $45/$MTCO_2e$	$2,152,559,262
Medium Carbon Price - $30/$MTCO_2e$	$1,435,039,508
Low Carbon Price - $15/$MTCO_2e$	$717,519,754

Note: NPV would increase correspondingly with each year that Merrimack Station continues to operate after 2030.

B. Control of Mercury and Other Toxic and Acid Gas Emissions

1. Merrimack Station is at risk regarding EPA's upcoming determination of Maximum Achievable Control Technology (MACT) for mercury. New federal MACT mercury control requirements may be imposed on Merrimack Station that would be more stringent than the scrubber can deliver. Fortunately, other technology options now exist that would likely achieve greater mercury reductions at lower cost than the scrubber.

a. In 2005 EPA issued the Clean Air Mercury Rule (CAMR) to cap and reduce mercury emissions from coal-fired power plants. Several environmental groups and states sued EPA arguing that CAMR did not comport with the Clean Air Act. In February 2008, the CAMR was remanded by the US District Court of Appeals and sent back to the EPA to be re-written. There is currently no federal mercury MACT emission

regulation while the EPA re-writes the rule. Fourteen states have enacted their own mercury regulations for power plants. (ADA, http://www.adaes.com/faq/index.html#Mercury)

2. MACT for existing facilities is defined as the average of the best-performing 12% of plants. It is not clear at this time what EPA will determine the MACT performance level (in percent reduction) to be, but several ongoing legal proceedings seek to compel the imposition of mercury MACT emissions limits on coal-fired power plants.
3. The proposed scrubber technology is primarily designed to reduce sulfur dioxide emissions, but in concert with selective catalytic reduction (SCR) NOx-control systems (which Merrimack Station has), it promises to reduce mercury emissions by 80%. If EPA determines that MACT requires greater reductions than these combined systems can achieve (say, 90%), then ratepayers will be at risk to pay for additional required mercury control technology (e.g., activated carbon injection (ACI) or TOXECON II technologies).
4. It is not clear that the combination of SCR and scrubber technology captures elemental as well as oxidized captured mercury. Therefore, the plant may require further investments in additional technology, such as ACI or TOXECON II technology. Annual operating costs may also be higher to capture elemental mercury through the use of halogens or oxidizing agents.
5. Commercial availability of mercury-control technology is demonstrated by the fact that more than 100 full-scale activated carbon injection systems have been ordered by U.S. coal-fired power generators as of April 2008 (Institute of Clean Air Companies).
    a. These contracts include both new and retrofit installations and represent more than 44 gigawatts of coal-based electric generating capacity. About 33 gigawatts of existing electric generating capacity (about 10% of total U.S. coal-based capacity) will be retrofitted with ACI to control mercury emissions. This includes halogen-treated carbon systems that can capture elemental mercury. ACI systems have the potential to remove 70% or more of the mercury, and in some cases, 90% or greater mercury capture, at a cost that can dip below $10,000 per pound of mercury removed. (National Energy Technology Laboratory (NETL), http://www.netl.doe.gov/newsroom/features/06-2008.html)
6. Mercury is the hazardous air pollutant of greatest concern at this time, but other toxic and acid gas emissions from Merrimack Station may be subject to additional control technology requirements – and associated costs to ratepayers – in the future. Other toxics include hydrochloric and sulfuric acid, hydrogen fluoride, and barium, chromium, manganese, and vanadium compounds, among others.
7. Costs: Data on mercury control costs indicates that the cost of retrofitting mid-sized coal-fired power plants with ACI systems is relatively inexpensive, averaging approximately $1-5 million capital cost and roughly the same amount in annual operating costs. A newer technology pioneered by the Electric Power Research Institute (EPRI) called TOXECON II, is more costly in terms of capital, at approximately $8-25 million capital cost, but this process allows the fly ash to be sold for

concrete without the need for a new fabric filter. As a result, plants equipped with TOXECON II will be able to avoid the loss of this revenue stream. The operating costs for TOXECON II are similar to those for ACI. (ICAC, 2005) Some data suggests parasitic load for these technologies are in the vicinity of 0.15 MW (Starns, 2008). Costs are likely to vary substantially based on site-specific space and configuration issues (e.g., hot side or cold side installation).

Rough Cost Estimates for Technology for Mercury MACT	
Capital Costs	$717,000 – $25,334,000
Operating Costs (per year)	$452,226 – $4,522,262

Present Value (PV) Cost Estimates for Mercury MACT	
At 2013, for 2013-2030 period, discount rate of 5%, capital + operating.	
High	$88,994,718
Low	$14,970,072

Note: NPV would increase correspondingly with each year that Merrimack Station continues to operate after 2030.

C. Cooling Water Systems

1. Merrimack Station discharges hot water into the Merrimack River, averaging around 50-55°F in mid-winter, 90-95°F in mid-summer, and occasionally reaching 100°F. Merrimack Station's federal National Pollutant Discharge Elimination System (NPDES) water discharge permit has expired and a renewal permit is pending at EPA. The plant could be required to convert to a closed-loop cooling system as have other fossil-fuel fired plants in the region. If the site's footprint allows, this would probably involve the construction and operation of one or more cooling towers, which would again involve capital costs for construction, annual operating costs, and parasitic load (i.e., electricity used to operate the pollution control technology).

    a. Almost all older power plants use once-through systems, which take water from a water body for cooling and then discharge the heated fluids back into the same body of water. Such systems have significant impacts on the local aquatic environments through the entrainment and entrapment of fish and fish larvae and through the heated water discharged at the end of the cooling cycle. In closed-cycle systems, cooling water is pumped through the plant's condenser and then through cooling towers. Closed-cycle systems use 95-98% less water than once-through systems. New power plants generally are required to have closed-cycle cooling systems, but many older plants still used once-through systems. When these plants' water permits are renewed, however, the issue arises of whether the plant's cooling system should be converted from a once-through to a closed system. Economic issues that should be evaluated regarding conversion from once-through to closed-cycle cooling systems include: (1) the estimated cost of making

conversions to closed-cycle systems; (2) performance and cost penalties associated with operating closed-cycle cooling systems; (3) analysis of the impact of the proposed cooling system conversion on electric system reliability; and (4) the impact of converting to closed-cycle cooling systems on the expected profits of the plant's owner. (Synapse, http://www.synapse-energy.com/expertise/cap powerplants.shtml)

2. Associated issues and concerns may include:
    a. NPDES permitting issues and delays (Merrimack Station's draft permit is now expected in mid-2009)
    b. Cost of conversion to a closed-cycle cooling system
    c. Energy penalty necessary to operate a closed-cycle system
    d. Consumptive water use
    e. Make-up; blowdown treatment and discharge
    f. Visible plumes, drift, particulate matter
    g. Noise pollution
    h. Site space, footprint, and separation distances
    i. Potential modifications to the condenser and other equipment (and the costs thereof)
    j. Other site-specific constraints, impacts, and costs
3. Costs: More research needs to be done to identify representative capital and operating costs associated with retrofitting mid-sized coal-fired power plants like Merrimack Station with closed-cycle cooling systems. Initial soundings suggest that these costs are likely to be in the range shown below. Costs are likely to vary substantially based on site-specific space and configuration issues. (Maulbetsch, 2003, 2006)

Rough Cost Estimates for Closed-Cycle Cooling System	
Capital Costs	$50,000,000–$100,000,000
Operating Costs (per year)	$5,000,000–$10,000,000

Rough Present Value (PV) Cost Estimates for Cooling System	
At 2013, for 2013-2030 period, discount rate of 5%, capital + operating.	
High	$240,771,835
Low	$120,385,918

Note: NPV would increase correspondingly with each year that Merrimack Station continues to operate after 2030.

D. Construction Costs and Delays

1. Construction and materials cost pressures are likely to bring delays and postponements
    a. Based on recent trends, it is reasonable to assume plant capital costs could be 20-40% higher than currently estimated costs. Analyzing such additional cost increases is justified, indeed necessary, in light of recent industry experience and the expectation that worldwide demand will

continue to be a driving force for rising prices for the foreseeable future. (Synapse, *Don't Get Burned, 2008*)

b. The cost of new power plant construction in North America increased 27% in 12 months and 19% in the most recent six months, a level 130% higher than in 2000. A power plant that cost $1 billion in 2000 would, on average, cost $2.31 billion today. The latest increases have been driven by high activity levels globally with continued tightness in the equipment and engineering markets, as well as historically high levels for raw materials. Excluding nuclear plants, costs have risen 79 percent since 2000. (IHS/CERA, 2/14/08, http://energy.ihs.com/News/Press-Releases/2008/North-American-Power-Generation-Construction-Costs-Rise-27-Percent-in-12-Months-to-New-High-IHS-CERA.htm)

c. In addition to regulatory and stakeholder opposition, rising construction costs continue to derail the construction of new coal-fired power plants throughout the US. Potential delays coupled with increasing costs of construction will likely result in significant upward adjustments in cost projections. This will ultimately result in increased electricity rates. In Nevada, the cost of Sierra Pacific Resources' proposed 1,500 MW Ely Energy Center has increased by more than 30% from $3.8 billion to $5 billion since it was first announced in 2006. In 2007, Duke Energy's proposal to build two 800 MW coal-fired generating units was reduced to one unit as a result of the North Carolina Utilities Commission's concern over the need for new capacity in light of rising construction costs and available alternatives. These two cases exemplify a national trend that has resulted from rapid increases in the cost of material inputs throughout the last several years. (Innovest, Sunflower Holcomb report, 2008, http://blog.climateandenergy.org/2008/03/25/news-update-new-report-on-sunflower-concludes-that-proposed-coal-plants-would-commit-western-kansas-ratepayers-to-decades-of-high-electricity-prices/)

2. Annual economic growth in China and India is now likely to dip from ~12% and 9% respectively, but still maintain 5-8% growth, keeping steel, concrete, etc. supplies under pressure (*The Economist*, 11/21/08)

   a. USDOE's Energy Information Agency's Annual Energy Outlook for 2008 anticipates 4-5% energy growth in China and India through 2015. (http://www.eia.doe.gov/oiaf/ieo/appi.html)

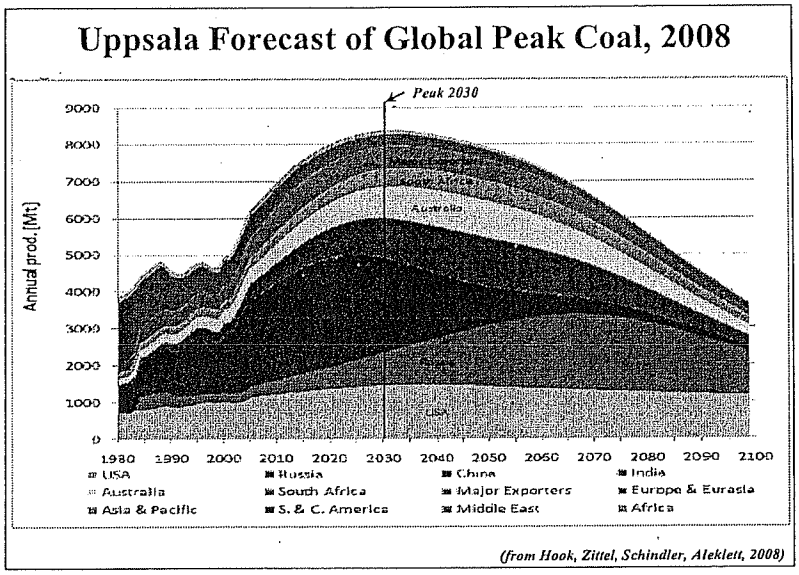
3. Risks that were once borne by contractors are being shifted to plant owners

   a. In the past, major Engineering, Procurement and Construction (EPC) contractors were willing to enter into fixed price contracts for new power plants. As a result, the contractors bore the risks that actual materials, equipment and component prices would be higher than estimated. Recent experience at a number of power plant construction projects shows that the major EPC contractors are no longer willing to enter into fixed price contracts. Construction project contracts now often shift the risks of higher commodities, equipment and/or labor costs to plant owners and investors. (Synapse, *Don't Get Burned, 2008*)

4. Costs: Costs associated with construction and delay are not calculable empirically in advance, but sensitivity assessments concerning construction costs, delays, and ratepayer impacts should be conducted and/or made available.

E. Fuel Costs and Issues

1. Aside from carbon, mercury, cooling system, and construction cost issues, the ongoing operation of Merrimack Station obviously requires ongoing outlays to purchase coal for fuel. As shown below, between now and 2030, these purchases represent a significant financial commitment from ratepayers. While such costs are mandatory for any combustion-based generation, they may not be necessary to the extent that electricity demand can be satisfied through energy efficiency and demand-side management measures and/or some renewable energy resources.
2. PSNH spends approximately $150 million per year for coal burned at Merrimack Station.
3. Recent trends in coal price and quality reinforce the importance of a thorough investigation into the ultimate costs of proceeding with the scrubber installation and continued operation of Merrimack Station. Prices for thermal coal have more than doubled over the last year – from ~$50-55/ton to ~$100-135/ton (Macquarie Bank, Reuters) and the current economic downturn is unlikely to affect this trend over the long term.
4. There is some evidence that "peak coal" (akin to M. King Hubbert's "peak oil") may be on the foreseeable horizon. Although not yet widely recognized, there is increasing evidence that economically recoverable coal reserves have been dramatically overstated. Some analysts project that global coal production will peak in the 2030-2040 timeframe.
    a. It is not possible to confirm the often-quoted assertion that there is a sufficient supply for the next 250 years. Present estimates of coal reserves are based upon methods that have not been reviewed or revised since their inception in 1974, and much of the input data were compiled in the early 1970s. Recent programs to assess reserves in limited areas using updated methods indicate that only a small fraction of previously estimated reserves are actually minable reserves. (National Academy of Sciences, 2007)
    b. The world could run out of economically recoverable reserves of coal much earlier than widely anticipated. ... Coal might not be so abundant, widely available and reliable as an energy source in the future. (Institute for Energy, The Future of Coal, Report to the European Commission, March 2007)



c. Projections of US domestic coal production are similar to the global picture.

d. Potential impact to NH ratepayers: Greater global competition for coal will maintain or increase coal prices, increasing fuel costs passed on to ratepayers.

e. Price impacts of global demand are already evident: As noted above, thermal coal prices have more than doubled from last year, from ~$50-55/ton to ~$100-135/ton (Macquarie Bank, Reuters).

5. Fuel quality: The average heat content of coal appears to be declining

a. In 1955 the average heat value was 30.2 MJ/kg; in 1976 this had declined to 27 MJ/kg. The trend continues from 1980 to present. Today the average heat value of American coal is only around 20.5 MJ/kg. The total decline in heating value is more than 30% since 1955. A part of this can be explained by the increasing amount of lignite and subbituminous coal since the 1970s. But even within each coal class the quality is declining. (from Heinberg, referencing Hook, Zittel, Schindler, Aleklett, Energy Policy, 2008)

b. Potential impact to NH ratepayers: Higher future coal costs for equal heat value, or less generation for the fuel cost projected.

6. Merrimack Station is at the end of the fuel transport supply chain

a. Transportation can be up to 70% of the delivered cost of coal, and rail bottlenecks may be a significant factor in future supply. (Heinberg, 2008)

b. Potential impact to NH ratepayers: Higher delivered fuel costs for equal heat value in the future as transportation costs increase, perhaps disproportionately due to accompanying increases in transportation fuel costs.

7. Issues regarding PSNH's September 2, 2008 fuel cost assumptions:

a. PSNH assumed a fuel cost of $4.82/MMBTU escalating at 2.5% per year. This cost escalation is certainly not consistent with recent coal price increases, which doubled over the last year.

b. PSNH's overall projected fuel costs reflect an ~34% increase 2007-2008; run level through 2012; and then escalate at 2.5% per year through 2028. This cost scenario is not likely, given the above supply constraints. The economic downtown may temper recent price fuel price increases, but this is not likely over the longer term of Merrimack Station's continued operation. A thorough investigation should thus include reasonable fuel price sensitivity analyses to better assess fuel cost risks to ratepayers.

c. In addition, PSNH currently purchases most of its coal for Merrimack Station from Venezuela, which means that its supply is also subject to geopolitical risks.

d. In today's marketplace, coal no longer necessarily wins economically. If coal stays at $100-150 per ton and if natural gas remains as low as it is or continues to fall in price, a lot of utilities will look at gas instead. (Buchsbaum, EnergyBiz, 2008).

8. Costs: Coal costs over the remaining life of Merrimack Station will represent a substantial financial commitment from ratepayers, especially in the face of increasing global demand. Such costs may not be necessary to the extent that electricity demand could be satisfied through energy efficiency measures and/or some renewable energy resources.

   The table below illustrates the present value of these costs assuming varying degrees of coal price escalation. Note that even the "High" scenario below reflects price increases far below those recently experienced in global coal markets.

Rough Present Value (PV) Cost Estimates for Coal Purchases	
At 2013, for 2013-2030 period, discount rate of 5%, $150 million per year.	
High – 10% per year	$3,930,781,449
Medium – 5% per year	$2,571,428,571
Low – 2.5% per year (PSNH, 9/2/08)	$2,111,577,529

Note: NPV would increase correspondingly with each year that Merrimack Station continues to operate after 2030.

F. Financial Issues

1. Financing terms and rates are uncertain due to the current credit crunch; this could have greater-than-anticipated impacts on financing costs.

   a. PSNH's September 2, 2008 report indicates that 52.8% of the scrubber installation will be financed with debt; no interest rate is specified.

2. Under the 2006 law (RSA 125-O:18), the cost of the scrubber must be recovered in PSNH's default energy service charges (i.e., they cannot be "socialized" over a broader ratepayer base or in other sales). This could increase the risk of a "death spiral" dynamic if current customers choose alternative energy providers and could disadvantage small businesses that may be unable to cost-effectively switch providers.

3. Under NH law, capital investment in pollution control equipment is not subject to property taxes. The scrubber investment would be the

dominant factor in Merrimack Station's net book value (e.g., by a factor of ~7 in 2013).

4. PSNH must seek future regulatory approval to finance the project, which will entail a review at the PUC of its use of the funds. This could potentially cause delays later in the process if a full investigation is not done now.

G. Recovery of Lost Generation Output

1. It is not clear if or to what extent the PSNH's cost estimates incorporate the cost of the scrubber's own electricity consumption. This energy penalty represents additional net cost that will be incurred by ratepayers, and it merits additional clarity.
2. Modifications have already taken place to recover net power output that will be lost to the scrubber (i.e., its "parasitic load" or "energy penalty"). These modifications to the plant are the subject of another PUC docket. Additional modifications for this purpose may also be planned or proposed.
3. If additional net power output recovery modifications are not necessary, why is the scrubber's cost ($457 million) unusually high compared to many scrubber installations?

H. Other Issues

1. Sulfur Dioxide Emissions
    a. With the installation of the scrubber (which is principally designed to reduce SO2 emissions and incidentally captures mercury as well), PSNH's SO2 emissions would drop dramatically. Correspondingly, its compliance costs under Title IV of the federal Clean Air Act (i.e., the federal Acid Rain program) would decline.
    b. PSNH appears to have already factored these reduced Acid Rain compliance costs into its calculations of the rate impacts of the scrubber. For example, in its September 2, 2008 filing spreadsheet, "Scrubber Only Incremental Costs" for 2013 are listed as -$29,775,129 (i.e., a savings of this amount). PSNH's spreadsheet characterizes these savings as varying between $22.8-30.5 million until 2017, when they stabilize at ~$20 million and then escalate at 2.5% per year. None of these figures, however, have been reviewed by the PUC or any other party.

I. Summary Table of Rough Cost Estimates of Potential Impacts

1. Overall Costs: A rough estimate of readily available potential cost impacts – ***in addition to PSNH's estimate of $457 million*** – concerning proposed and potential changes at Merrimack Station is shown below. Note that this estimate does not include costs associated with construction or for fuel for the remaining life of the plant, costs which have escalated dramatically in recent years.

Rough Estimates of Overall Present Value Costs		
At 2013, for the period 2013-2030, discount rate 5% capital + operating.		
Description	High	Low
Carbon Allowances	$2,152,559,262	$717,519,754
Mercury (to meet MACT)	$88,994,718	$14,970,072
Closed-Cycle Cooling System	$240,771,835	$120,385,918
Total	**$2,482,325,815**	**$852,875,744**

Note: NPV values will increase correspondingly with each year that Merrimack Station operates beyond 2030.

2. Rough Estimate of Effect on Energy Service Rates: Using a simple ratio comparing the above totals to PSNH's indication that the $457 million scrubber installation produces a 0.33¢/kWh rate impact, the following table estimates the overall future rate impacts that can be expected:

	PSNH Calculation	**High Cost Scenario**	**Low Cost Scenario**
Scrubber Cost	$457,000,000	$457,000,000	$457,000,000
Additional Costs	$0	$2,482,325,815	$852,875,744
Total Costs	**$457,000,000**	**$2,939,325,815**	**$1,309,875,744**
Scrubber Rate Impact	0.33¢ per kWh	0.33¢ per kWh	0.33¢ per kWh
Additional Rate Impacts	n/a	1.79¢ per kWh	0.62¢ per kWh
Total Rate Impact	**0.33¢ per kWh**	**2.12¢ per kWh**	**0.95¢ per kWh**
Multiple of PSNH's Rate Impact Estimate	**n/a**	**6.4**	**2.9**

J. Examples of Studies Needed Before Construction of the Scrubber Should be Approved

1. Comprehensive cost/risk assessment of carbon and mercury liabilities, and perhaps other hazardous air pollutants.
2. Assessment NPDES permitting issues, cooling system issues and costs, other associated costs, constraints (e.g., space) and risks of further delay.
3. Thorough assessment of power flow analysis and other ISO-NE transmission grid issues to investigate potential transmission and distribution (T&D) impacts, ISO impacts, capacity and capacity payments impacts, etc. (Initial inquiries suggest that such a study is likely to cost ~$200,000-250,000.)
4. Comparisons of the cost and reliability impacts of energy efficiency, renewable energy, distributed generation, and new, cleaner energy generation.

5. Assessment of rate and revenue impacts on viability if customers depart PSNH for other suppliers. Under the 2006 mercury law, all costs of the scrubber project will be recovered through energy service rates, so customers who leave its energy service will not pay those costs. (RSA 125-O:28)
6. Increasing emphasis on energy efficiency in residential, commercial, industrial and institutional buildings and processes is likely to moderate future demand growth projections. Already there is strong anecdotal evidence that demand for electricity is falling measurably (see for example http://online.wsj.com/article/SB122722654497346099.html), though it is not clear how much of this is a long-term trend or due to the current economic turmoil. PSNH is estimating that its sales will decline by ~3% in 2009. The likely depth, breadth, and longevity of these factors – notably with respect to ratepayer impacts of existing fixed costs and proposed new capital investments (e.g., the scrubber) – need to be carefully considered.

IV. Consideration of Alternative Energy Paths

A. Numerous studies and analyses (e.g., McKinsey & Company, the American Council for an Energy Efficient Economy (ACEEE), the Center for Climate Strategies, etc.) indicate that significant opportunities for energy demand reduction and associated savings exist today. In addition, less costly energy supply approaches may exist, particularly in terms of avoiding a long-term commitment to coal-fired generation with its high environmental and economic risks and impacts. A thorough investigation should be conducted to determine if any of the alternatives below – or others – represent better paths to protect PSNH ratepayers and New Hampshire's quality of life.

1. Step up energy efficiency programs, resulting in reduced electricity demand and lower consumer energy costs. Efficiency is, by far, New Hampshire's largest and least costly "source" of energy.
2. Pursue distributed generation such as wind and solar electric generators or new, hyper-efficient oil, gas, or wood pellet-fired combined heat and generating units installed at homes and businesses. This could also reduce the need for future power transmission and distribution capacity.
3. Pursue "smart grid" and smart metering technology. A recent smart grid test in Washington State reduced home energy consumption by at least 10%. The low-cost, wireless ZigBee open communications standard for smart appliances, meters, etc for homes, businesses, and utilities is now in place. Pacific Gas and Electric of California will install up to 3.3 million GE smart meters for some of its customers. The provinces of Victoria, Australia and Ontario, Canada now require installation of smart meters for all energy users. National Grid recently announced its intention to launch trials of this technology.
4. Require or incent PSNH to enter into medium- and long-term purchased power contracts from clean, renewable energy sources. New England

now has sufficient surplus natural gas and renewables capacity that the decommissioning of Merrimack Station could be accommodated.

5. Allow PSNH to build renewables plant under regulated rates. (This option is strongly opposed by renewables developers.)
6. Purchase power from under-utilized natural gas fired plants, which emit no mercury and far less CO_2 per kWh than coal. The nearby 750 MW Granite Ridge gas-fired power plant is apparently for sale by a group of post-bankruptcy note holders who now control it. That plant could be shifted from peaking to baseload service during a transition period between Merrimack Station's closure and the availability of even lower emission, lower-cost options. (The higher cost of gas must be factored into a ratepayer analysis, however recent fuel pricing trends suggest that natural gas generation has become competitive with coal-fired power plants.)
7. Enhance transmission capacity to permit delivery of increased generation from clean sources in New Hampshire's North County. An estimated 400 MW of additional New Hampshire wind and biomass generating resources could be unlocked by added transmission capacity. (The NH PUC held its first meeting on August 21, 2008 to try to develop a plan for the expansion of transmission capacity in the North Country as established by Senate Bill 383.)
8. Enhance transmission capacity to allow delivery of available Canadian renewable power. (This is opposed by some environmentalists and by those who wish to preserve the economic benefits of renewables development within the state.)
9. Pursue utility-scale combined heat and power (CHP) generation, such as that proposed in Berlin-Gorham.
10. Adopt a new regulatory framework as an alternative to rate-of-return regulation, allowing PSNH to profit from efficiency programs, smart grid/metering, effective long term purchased power contracts, etc.
11. Other approaches or combinations of alternatives that a comprehensive investigation may show feasible.

B. Energy Efficiency (EE) and Renewable Energy (RE) Examples (ACEEE; Center for Climate Strategies; similar assessments exist for 20+ states)

1. Florida
   a. Implementing 11 specific EE/RE policies could reduce projected future electricity use by ~29% in the next 15 years and reduce peak electricity demand by ~32%.
   b. This would reduce consumer energy costs by $28 billion compared to constructing new power plants.
   c. This would result in the creation of 14,000 new jobs in Florida, roughly equivalent to nearly 100 new manufacturing plants relocating to the state.

d. This would reduce CO_2 emissions over 37 million tons in 2023 and other pollutants similarly.

2. Texas

a. Implementing 9 specific EE/RE policies could reduce projected future electricity use by ~22% in the next 15 years and reduce peak electricity demand by ~33%.

b. This would reduce consumer energy costs by $73 billion over 15 years (~4.5 cents/kWh levelized cost).

c. This would result in a net employment increase of about 38,300 jobs, roughly equivalent to the employment that would be supported by the construction and operation of 300 small manufacturing plants.

d. Air emissions from power plants would be reduced by 20–22% by 2023.

C. The NH Public Utilities Commission has commissioned a study on the remaining energy efficiency potential in the state. The final report is expected this month.

D. Natural Gas

1. At what point is natural gas more competitive? Some sources suggest that we are already at or near that point.

E. Governor's Climate Change Task Force

1. The Governor's Climate Change Task Force may make additional recommendations that bear on this issue.

F. Jobs and Labor Opportunities Associated with Energy Alternatives

1. PSNH's September 2, 2008 filing with the NHPUC indicates that the scrubber installation will take four years to complete, and that at its peak, the project will require the efforts of more than 300 union craft workers in addition to engineering and management support services. It is not clear from PSNH's filing precisely how many full-time-equivalent (FTE) jobs these efforts will actually represent or for how long.

2. University of New Hampshire Prof. Ross Gittell and research scientist Matt Magnusson recently completed a study on "green jobs" in the state – *New Hampshire's Green Economy: Current Employment and Future Opportunities*. They divided "green jobs" into five categories, two of which were energy efficiency and renewable energy. Their research indicates that New Hampshire now has ~17,000 green jobs, but only about 4,600 (26%) in energy efficiency and just 200 (1%) in renewable energy. Gittell's & Magnusson's work indicates ***significant future job growth opportunity if New Hampshire focuses on the green economy, including job growth in traditional industries such as construction and real estate.***

3. In a separate analysis of the economic impacts of the Regional Greenhouse Gas Initiative (RGGI), Gittell and Magnusson (January 2008) corroborate the economic and employment opportunity that energy efficiency can provide for New Hampshire. Their assessment, *Economic Impact in New Hampshire of the Regional Greenhouse Gas Initiative*

(RGGI): An Independent Assessment, indicates that if allowance revenues were used for energy efficiency, the overall economic affect would be to increase the state's employment by ***815 jobs*** and its economy by $63 million (or 0.06% of total annual gross state product).

4. University of Massachusetts-Amherst researchers have calculated that a $100 billion national program to create good jobs and start building a low-carbon economy could create 2 million new jobs in two years (Robert Pollin et al, Center for American Progress (CAP) and Political Economy Research Institute (PERI), Green Recovery, September 2008). About ***40% of this job gain would occur in the construction industry*** as a result of the program's focus on six green infrastructure investment priorities. Disaggregated to the state level based on population and gross domestic product, ***New Hampshire's share would be $432 million. Net job creation in the state would be 9,245 jobs***. And at this time, a much larger federal stimulus and recovery funding program is being considered (e.g., $1 trillion), so resulting job growth could be much larger as well.

5. Over the last 35 years, California has reduced its per capita energy requirements to 40% below the national average through energy efficiency policies. University of California–Berkeley researcher David Roland-Holst examined household reductions in per capita electricity demand over the period 1972–2006 in order to answer the question "Given California's economic structure, how would employment growth have proceeded in the absence of household energy efficiency?" (*Energy Efficiency, Innovation and Job Creation in California, October 2008*)

   Roland-Holst's core findings include:

   a. Energy efficiency measures have enabled California households to redirect their expenditure toward other goods and services, ***creating about 1.5 million FTE jobs*** with a total payroll of over $45 billion, driven by well-documented household energy savings of $56 billion from 1972-2006.

   b. As a result of energy efficiency, California reduced its energy import dependence, and directed a greater percentage of its consumption to in-state, employment-intensive goods and services, whose supply chains also largely reside within the state, creating a "multiplier" effect of job generation.

   c. The same efficiency measures resulted in slower growth in energy supply chains, including oil, gas, and electric power. For every new job foregone in these sectors, however, more than 50 new jobs have been created across the state's diverse economy.

   d. Sectoral examination of these results indicates that job creation is in less energy intensive services and other categories, further compounding California's aggregate efficiency improvements and facilitating the economy's transition to a low carbon future.

6. Expanding the use of renewable energy is not only good for energy self-sufficiency and the environment; it also has a significant positive impact on employment. This is the conclusion of 13 independent reports and studies analyzed by UC-Berkeley researchers Daniel Kammen, Kamal Kapadia and Matthias Fripp. Their study, *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* (April 2004)

assessed the economic and employment impacts of the clean energy industry in the United States and Europe. Key findings include:

a. Across a broad range of scenarios, the ***renewable energy sector generates more jobs than the fossil fuel-based energy sector*** per unit of energy delivered. (See tables below.)

b. The employment rate in fossil fuel-related industries has been declining steadily for reasons that have little to do with environmental regulation.

c. Supporting renewables within a comprehensive and coordinated energy policy that also supports energy efficiency and sustainable transportation will yield far greater employment benefits than supporting one or two of these sectors separately.

d. Generating local employment through the deployment of local and sustainable energy technologies is an important and underutilized way to enhance national security and international stability.

Energy Technology	Source of Estimate	Average Employment Over Life of Facility (jobs/MWa)		
		Construction, Manufacturing, Installation	O&M and fuel processing	Total Employment
PV 1	REPP, 2001	6.21	1.20	7.41
PV 2	Greenpeace, 2001	5.76	4.80	10.56
Wind 1	REPP, 2001	0.43	0.27	0.71
Wind 2	EWEA/Greenpeace, 2003	2.51	0.27	2.79
Biomass – high estimate	REPP, 2001	0.40	2.44	2.84
Biomass – low estimate	REPP, 2001	0.40	0.38	0.78
Coal	REPP, 2001	0.27	0.74	1.01
Gas	Kammen, from REPP, 2001; CALPIRG, 2003; BLS, 2004	0.25	0.70	0.95

Table ES–1: Average employment for different energy technologies. "MWa" refers to average installed megawatts de-rated by the capacity factor of the technology; for a 1 MW solar facility operating on average 21% of the time, the power output would be 0.21 MWa. References in parentheses and sources refer to the studies reviewed in the text.

Scenarios	Average employment associated with each scenario (jobs)		
	Construction, Manufacturing, Installation	O&M and Fuel Processing	Total Employment
Scenario 1: 20% Renewable Portfolio Standard (RPS) by 2020 (85% biomass, 14% wind energy, 1% solar PV)	52,533	111,136	163,669
Scenario 2: 20% Renewable Portfolio Standard (RPS) by 2020 (60% biomass, 37% wind energy, 3% solar PV)	85,008	91,436	176,444
Scenario 3: 20% Renewable Portfolio Standard (RPS) by 2020 (40% biomass, 55% wind energy, 5% solar PV)	111,879	76,139	188,018
Scenario 4: Fossil Fuels as Usual to 2020 (50% coal and 50% natural gas)	22,711	63,657	86,369
Scenario 5: 20% Gas Intensive by 2020 (100% natural gas)	22,023	61,964	83,987

Table ES–2: Comparison of the estimated employment created by meeting the equivalent of 20 percent of current U.S. electricity demand via and expansion of fossil or renewables-based electricity generation.

7. In a September 2008 study, *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*, the United Nations Environment Program (UNEP) concluded that:

a. Along with expanding investment flows and growing production capacities, ***employment in renewable energy is growing at a rapid pace***, and this growth seems likely to accelerate in the years ahead.

b. ***Compared to fossil-fuel power plants, renewable energy generates more jobs per unit of installed capacity, per unit of power generated and per dollar invested.***

c. Overall, the number of people presently employed in the renewable energy sector runs to about 2.3 million. Given the gaps in employment information, this is no doubt a conservative figure. (See UNEP Table ES-1 below.)

d. Additionally, many studies have begun to assess the number of potential jobs that would be created through energy-efficiency measures including investment, standards, and mandates. UNEP Table ES-2 below highlights some of these job predictions.

Table ES-1. Estimated Employment in the Renewable Energy Sector, Selected Countries and World, 2006

Renewable Energy Source	World	Selected Countries*	
Wind	300,000	Germany	82,100
		United States	36,800
		Spain	35,000
		China	22,200
		Denmark	21,000
		India	10,000
Solar PV	170,000**	China	55,000
		Germany	35,000
		Spain	26,449
		United States	15,700
Solar Thermal	624,000-plus	China	600,000
		Germany	13,300
		Spain	9,142
		United States	1,900
Biomass	1,174,000	Brazil	500,000
		United States	312,200
		China	266,000
		Germany	95,400
		Spain	10,349
Hydropower	39,000-plus	Europe	20,000
		United States	19,000
Geothermal	25,000	United States	21,000
		Germany	4,200
Renewables, Combined	2,332,000-plus		

**Countries for which information is available. **Under the assumption that Japan's PV industry employs roughly as many people as Germany's PV industry.*

Table ES-2. Job Projections from Energy-Efficiency Measures in the Building Sector

Country	Study or Project Description	Projected Jobs
Canada	Retrofit municipal buildings on a national scale	5,600–7,840 full-time equivalent
European Union	European Commission Study: 20 percent reduction in EU energy consumption	1 million
	European Trade Union Confederation Study: 75 percent reduction of CO_2 emissions in the residential building sector	1.377 million by 2050 or 2.585 million by 2030
India	Replacing traditional cook stoves with recently developed biomass cooking technologies for 9 million households	150,000
United States	Apollo Alliance Study: $89.9 billion investment in financing for green buildings, providing tax incentives, investing in research and development, and promoting new building codes and standards	827,260
	U.S. Department of Energy: Standards on clothes washers, water heaters, and fluorescent lamp ballasts	120,000 through 2020

8. In a September 2000 study entitled *Working for the Environment: A Growing Source of Jobs* (Renner, Working Paper #152), the Worldwatch Institute concluded from numerous studies that ***wind power compares favorably in its job-creating capacity with coal- and nuclear-generated electricity***. In Germany, although wind energy contributed a still minuscule 1.2% of total electricity generation in 1998, it provided some 15,000 jobs in manufacturing, installing, and operating wind machines. In comparison, nuclear power had 33% of the electricity market but supported a relatively meager 38,000 jobs; coal-generated power had a 26 percent market share and gave rise to 80,000 jobs. Given the rapid expansion of wind power in Germany, wind will likely overtake nuclear power as a source of jobs in 2000.

9. The ***United Steel Workers (USW) and the Communications Workers of America (CWA)*** have partnered with the Sierra Club and the Natural Resources Defense Council (NRDC) to create the BlueGreen Alliance, a strategic partnership between labor unions and environmental organizations to recognize and expand the job-creating potential of the green economy.

10. The ***Building and Construction Trades Department of the AFL-CIO, the Industrial Union Council (AFL-CIO), the International Brotherhood of Boilermakers, the United Association of Plumbers and Pipefitters***, and the Environmental Defense Fund sponsored a November 2008 study by Duke University researchers, *Manufacturing Climate Solutions: Carbon-Reducing Technologies and U.S. Jobs.* The report indicates that U.S. manufacturing is poised to grow in a low-carbon economy. The sponsors explicitly state that the demand for climate solutions ***will create—very directly—manifold job opportunities in many sectors, from core industries such as renewable and energy efficiency businesses to traditional areas such as construction trades, pipefitting and electrical jobs***. They also note the vast supporting cast of industries that make up the supply chain for low carbon end products, citing the example of rising demand for wind turbines:

That's good for turbine manufacturers, but the economic benefits don't stop there: A wind turbine contains 8,000 parts, so demand for each one of these parts is rising, too. Following the "value chain" for low carbon technologies reveals that they have vast potential to grow sectors of our economy that aren't traditionally associated with environmental protection.

11. A report released by the U.S. Conference of Mayors in October 2008, *U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy,* says the U.S. economy currently has more than 750,000 green jobs, and that number is projected to grow five-fold in the next three decades.
    a. ***Green jobs in the Manchester-Nashua area are projected to grow from 486 in 2006 to 3,843 in 2038***
    b. Green jobs in the Boston-Cambridge-Quincy-Southern New Hampshire area (MA-NH Metropolitan Statistical Area) are projected to grow from 19,799 in 2006 to 156,660 in 2038.
12. Numerous other studies and reports document and/or forecast substantial job growth through alternative energy supply options and increasing efficiency in energy use.

V. Process and Framing Questions, Concerns, and Issues

1. Ratepayer-funded electric generation through regulated monopolies like PSNH is a creation of statute, so it is incumbent upon the legislature and the NHPUC to protect the ratepayers' interests – including consideration of the scrubber and increasing operating costs for Merrimack Station.
2. The recommendations of the Governor's Climate Change Task Force, and other state emission reduction commitments, should be taken into consideration.
3. Merrimack Station's CO_2 emissions exceed the entire emissions of Nepal or the Congo, and are almost 60% higher than those of Iceland or Mozambique.
4. The situation we face with Merrimack Station is analogous to the "repair-or-replace" decision we face regarding an automobile at "trade-in" time.

VI. Conclusion

At this time, no analysis has been performed of PSNH's revised cost estimate for installing scrubber technology at Merrimack Station in Bow, which increased the estimate from $250 million to $457 million since 2006, nor has any consideration been given to the anticipated additional costs estimated above. The magnitude of the potential costs associated with installing the scrubber and continuing to operate Merrimack Station for at least 15-20 more years requires a thorough investigation by the NH Public Utilities Commission to determine whether PSNH's plan represents the best path forward for ratepayers and for the State of New Hampshire as a whole.

Kenneth A. (Ken) Colburn is the Principal of Symbiotic Strategies, LLC, an independent consultancy on issues of climate change, energy, public policy, and the intersection of environmental and economic opportunity. Colburn has helped lead several state climate action planning processes and has provided strategic assistance to foundations, progressive companies, and non-governmental organizations in their efforts to address climate and energy concerns. Previously Colburn was Executive Director of the Northeast States for Coordinated Air Use Management (NESCAUM) and Director of the Air Resources Division of the New Hampshire Department of Environmental Services (NHDES). Colburn was previously Vice President for Energy and Environmental Policy at the Business & Industry Association of New Hampshire (BIA). Colburn holds a B.S. degree in mathematics from M.I.T. and M.B.A. and M.Ed. degrees from the University of New Hampshire.

STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DE 07-108

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

2007 Least Cost Integrated Resource Plan

Order Accepting Integrated Resource Plan

ORDER NO. 24,945

February 27, 2009

APPEARANCES: Gerald M. Eaton, Esq. on behalf of Public Service Company of New Hampshire; Brown, Olson & Gould by David Shulock, Esq. on behalf of Bridgewater Power Company; Orr & Reno by Douglas L. Patch, Esq. on behalf of TransCanada Hydro Northeast, Inc.; August Fromuth on behalf of Freedom Logistics, LLC and Halifax American Energy Company, LLC; Office of Consumer Advocate by Meredith Hatfield, Esq. on behalf of residential ratepayers; F. Anne Ross, Esq. on behalf of Commission Staff.

I. PROCEDURAL HISTORY

On September 28, 2007, Public Service Company of New Hampshire (PSNH) filed its 2007 Least Cost Integrated Resource Plan (LCIRP) pursuant to RSA 378:38. An Order of Notice was issued on January 4, 2008, scheduling a prehearing conference for January 31, 2008. Halifax American Energy Company, LLC (Halifax), Freedom Logistics, LLC (Freedom), TransCanada Hydro Northeast, Inc. and TransCanada Power Marketing, Ltd. (TransCanada), Bridgewater Power Company (Bridgewater), and Constellation Energy Commodities Group, Inc. and Constellation New Energy, Inc. (Constellation) each petitioned to intervene. On January 10, 2008, the Office of Consumer Advocate (OCA) filed notice of its intent to participate on behalf of residential ratepayers pursuant to RSA 363:28. At the prehearing conference, the Commission granted all petitions to intervene.

On March 28, 2008, PSNH supplemented its LCIRP in three areas: Demand Side Management, Supplemental Power Procurement Strategy, and New Generation Supply Options. Staff filed the direct testimony of George R. McCluskey on June 6, 2008. On August 15, 2008, PSNH filed the rebuttal testimony of Terrance J. Large, Gilbert E. Gelineau and Stephen R. Hall.

PSNH filed a series of motions for confidential treatment. On April 7, 2008, PSNH requested that its supply-side work papers regarding the 2007 LCIRP be treated as confidential. Constellation and Bridgewater objected to PSNH's request for confidentiality on April 17, 2008. On May 2, 2008, PSNH filed two motions requesting confidential treatment for forward coal prices and computer models respectively. PSNH filed a motion on May 14, 2008 requesting confidential treatment of a study performed by R.W. Beck on the cost to build biomass power plants and, on May 15, 2008, a motion requesting confidential treatment of certain cost assumptions regarding its Newington Station.

During the course of this docket the parties and Staff conducted discovery and participated in one technical session and four settlement conferences. On October 7, 2008, Staff and some of the parties filed a Partial Settlement Agreement and on October 10, 2008, TransCanada, Freedom and Halifax filed letters regarding additional issues to be presented at hearing. The OCA elected not to sign the Partial Settlement Agreement. Hearing was held on October 14, 2008.

II. POSITIONS OF THE PARTIES AND STAFF

A. PSNH LCIRP

PSNH contends that the information contained in its LCIRP and in the supplements filed on March 28, 2008 satisfies the requirements of RSA 378:38 and is consistent with the partial

settlement approved by Order No. 24,695 (November 8, 2006) in Docket DE 04-072. The following is a summary of the information contained in the LCIRP:

Electrical Energy Demand Forecast:

PSNH describes the methodology and assumptions used to develop short-term and long-term energy and peak demand forecasts and illustrates forecast scenarios based on high and low growth scenarios. The short-term forecasts are used for planning supplemental energy purchases and the long-term forecasts are used for capital additions planning.

Assessment of Demand-Side Programs:

PSNH describes its involvement in conservation and load management ("C&LM") efforts through the New Hampshire CORE Energy Efficiency programs. In addition to the CORE programs, PSNH describes several demand-side management programs that it offers at the retail level, including the Peak Smart and HEATSMART, as well as demand-side programs offered by ISO-New England at the wholesale level.

Assessment of Supply Options:

PSNH describes its existing generation supply resources and discusses how it meets customers' energy requirements with a mix of owned resources and supplemental purchases. In addition, PSNH conducted an economic analysis of the supply options it deemed might be appropriate for its system, assuming existing legislation prohibiting such options was amended. The analysis was based on a ranking system that took into account the following criteria:

(1) Net revenue requirements
(2) Environmental compliance costs
(3) Fuel diversity
(4) Availability at time of system peak
(5) Promotion of system stability

Assessment of Transmission Requirements:

PSNH describes its own as well as regional transmission systems and indicates who has responsibility for coordination and planning.

Provision for Diversity of Supply Sources:

PSNH explains how its mix of coal, oil, natural gas, hydroelectric, biomass, and IPP supply resources satisfy fuel diversity requirements.

Integration of Demand-Side and Supply-Side Options:

PSNH describes how it analyzed available supply-side and demand-side resource options in order to identify the combination that provides lower costs to customers as compared with pure market purchases.

Assessment of Plan Integration and Impact on State Compliance with the Clean Air Act Amendments of 1990:

PSNH describes its use of fuel switching and emissions allowance management strategies to comply with the federal Clean Air Act Amendments of 1990.

New Hampshire Renewable Portfolio Standard:

The New Hampshire Legislature passed the Renewable Portfolio Standard requiring that a portion of PSNH's electricity supply come from renewable sources. This section describes the RPS requirements and PSNH's strategy for compliance.

Compliance with the National Energy Policy Act of 1992:

The Energy Policy Act ("EPAct") of 1992 added certain provisions to the Public Utility Regulatory Policies Act ("PURPA") of 1978 standards which relate directly to integrated resource planning. This section describes PSNH's compliance with the EPAct in the areas of integrated resource planning and energy efficiency and demand-side management programs.

Assessment of the Plan's Long-term and Short-term Environmental, Economic and Energy Price and Supply Impact on the State:

In addition to the Clean Air Act Amendments of 1990, there have been several federal and state environmental initiatives affecting PSNH's air emissions including sulfur dioxide (SO_2), nitrogen oxide (NO_x), carbon dioxide (CO_2) and mercury (Hg). This section discusses the impact that current and potential federal and state regulations are likely to have on PSNH and its customers.

B. PSNH Rebuttal Testimony

In testimony rebutting Staff's conclusions on the adequacy of the LCIRP, PSNH stated that the Commission should assess the LCIRP in the appropriate context. According to PSNH, differences between itself and Staff are based on a different perception of the purpose and intent of the plan as well as different methodologies used to comply with the requirements for the LCIRP.

Among other things, PSNH argued that its assessment of demand-side resource potential consisted of the development of forecasts of peak load and energy reduction under different program implementation scenarios reflecting a broad range of commercially available energy-efficiency and demand-reduction measures under realistic funding constraints. It further argued that its analysis of a demand response program includes reasonable incremental costs for metering and administration, that avoided transmission and distribution capacity costs were not included as benefits in the analysis because of the contingent nature of demand response and the inclusion of a 15% adder for non-quantified benefits in the TRC test is consistent with the definition of the TRC test authorized by Commission Order 23,574. PSNH also contends that its multi-criteria approach to ranking resource options is justified given the requirement in Order No.24,695 to take into account: (1) the environmental compliance costs of each option, (2) fuel diversity benefits of each option, (3) the availability of each option at the time of system peak, and (4) whether each option will promote price stability. Finally, PSNH argued that the contention that continued unit operation studies should be conducted for the Merrimack and Newington Stations is not consistent with Order No. 24,695 in the previous LCIRP docket.

C. STAFF

In its pre-filed testimony, Staff concluded that PSNH did not perform an assessment of the potential for demand-side resources in its service territory, as required by the partial settlement agreement approved by Order No. 24,695. Staff further noted that information on the technical and economic potential of demand-side resources for New Hampshire should become available in the near future when the consultant hired by the Commission to investigate the potential for energy efficiency in New Hampshire submits its report. Staff recommended that

PSNH use information from that study as the basis of the demand-side assessment in its next LCIRP filing.

Staff claimed that PSNH's conclusion that an ISO-NE administered demand response program should not be implemented at this time is not supported by PSNH's own economic analysis. Staff recommended that the Company undertake a more detailed assessment of demand response programs to determine whether the public interest would be served by offering such a program to large customers. Staff recommended eliminating the benefits adder for environmental externalities included in the cost effectiveness test for demand-side resources.

Staff took the position that the generic cost information provided by PSNH relating to the construction or acquisition of new generation options was deficient in several important respects. First, the revenue requirements estimates for the wind and biomass options leave out the cost of transmission. Second, the revenue requirements estimates for the biomass and peaking plants do not include the cost of land or reflect the need for capital additions. Third, the cost of fuel for the biomass and peaking plants is unrealistic in that PSNH assumed fuel costs would decline in real terms over the plant lives. Fourth, even though the federal Business Energy Tax Credit is due to expire at the end of 2008, and is not currently available to public utilities, the tax credit was included in the revenue requirements for solar PV. Fifth, according to Staff, the method used to rank the new generation options is flawed. Based on these conclusions, Staff argued that the generic cost information does not support giving PSNH the authority to construct or acquire new generation capacity.

Staff suggested that PSNH conduct an analysis to determine whether continued operation of the Merrimack Station is economic relative to market purchases when the costs of installing and operating the scrubber are taken into account. Finally, Staff recommended that PSNH

conduct an analysis to determine whether operation of the Newington Station is economic relative to market purchases based on fuel costs that reflect current forward prices.

III. PARTIAL SETTLEMENT AGREEMENT

In the Partial Settlement Agreement submitted in this docket (Partial Settlement), the settling parties recommended that the Commission find that PSNH's 2007 LCIRP includes the information required by RSA 378:39 and is therefore adequate to the extent required by RSA 378:40 to authorize the Commission to approve changes in PSNH's rates.

The settling parties ask the Commission to clarify that any order accepting the 2007 LCIRP shall not constitute endorsement or approval of the resource options contained in the plan, or of the construction or ownership of new generation by PSNH, nor shall such order establish a precedent or have any binding effect in the event PSNH proposes any future pursuit of any specific resource contained in the plan. Omission of any resource from the 2007 LCIRP shall not preclude PSNH from proposing that resource, unless PSNH is required by law to include such a resource in an LCIRP.

The settling parties agree that PSNH's next LCIRP shall include all of the information specified in the Partial Settlement, as well as the information described in Order No. 24,695 with the understanding that to the extent conflicts arise the terms of the Partial Settlement shall prevail over Order No. 24,695. PSNH agrees to file its next LCIRP one calendar year following final approval of its 2007 LCIRP plan.

The Partial Settlement also contains the following provisions:

A. Demand-Side Resources

1. Analysis of Demand-Side Potential. Consultants hired by the Commission are currently conducting an analysis of the potential for energy efficiency and demand reduction in

New Hampshire. The consultants' final report is intended to show the technical potential, economic potential and market potential for energy efficiency and demand-side management in New Hampshire and in each electric and gas franchise territory. This study is expected to form the basis for the Commission's assessment of demand-side potential for each utility. In its next LCIRP filing PSNH will base its assessment of demand-side resources on the results of the study, applicable to PSNH's franchise area, as amended by the Commission. To the extent PSNH determines that any of the potential demand-side opportunities in the consultants' report are not appropriate for its franchise area, PSNH will explain with supporting documentation or studies (such as cost/benefit analyses), why its demand-side resource plan does not take into account the potential associated with such resource opportunities.

2. Analysis of Demand Response Programs. In its next filing, PSNH will include in its economic analysis of demand response programs, including the ISO-New England Demand Response program, only those incremental capital costs and incremental administrative expenses incurred by PSNH to implement such programs. It is understood and agreed that the installed cost of a meter for large customers in Rate GV and Rate LG are not incremental because the meters currently installed are capable of being modified and reprogrammed in ways that meet program requirements. The prudent costs to modify and reprogram existing meters are understood to be incremental.

In addition, the settling parties agree that PSNH will perform an assessment of the savings in transmission or distribution costs associated with demand response programs and will include the results of the assessment in its next LCIRP filing. The results of the assessment will also be reflected in the economic analysis of the demand response programs included in the next filing.

3. Total Resource Cost Test for Demand-Side Measures. The settling parties agree that the Total Resource Cost test should be used in LCIRP and CORE energy efficiency proceedings to determine the cost effectiveness of energy efficiency and demand response programs. Further, in a supplement[1] to the Partial Settlement, PSNH and Staff agree that the avoided costs used in PSNH's next LCIRP and in CORE Energy Efficiency proceedings should reflect market-based environmental benefits and should not include non-quantified benefits unless otherwise ordered by the Commission.

B. Supply-Side Resources

1. Analysis of Biomass and Wind Units. In its next LCIRP filing, PSNH's economic analysis will include, in addition to the costs included in the 2007 LCIRP, the costs of land, capital additions and transmission costs. PSNH will also provide a fully supported biomass fuel price forecast. The biomass fuel price forecast will include a base case with high and low scenarios. PSNH may also prepare and include a range of land and transmission cost estimates. To the extent there is a specific site or sites under consideration, PSNH may submit the site specific data under a motion for protective order.

2. Analysis of Solar Photovoltaic. In its next LCIRP filing, PSNH will prepare its economic analysis based upon the then existing law concerning tax advantages for utilities. PSNH's analysis will include estimates of operating and maintenance expense for photovoltaic systems including a factor for the degradation in the output of the photovoltaic device over time.

3. Ranking of Supply-side Resource Options. In its next LCIRP filing, PSNH's ranking of supply-side options will be based upon a revenue requirements analysis. Fuel diversity, price stability, transmission stability, and statewide or local economic benefit may be used as tie breakers in the ranking analysis.

[1] Hearing Exhibit 7 filed October 14, 2008.

Given the inclusion of Renewable Energy Certificate (REC) revenues in the revenue requirements calculation for renewable resources and SO_2 and NO_x allowance expenses in the revenue requirements for non-renewable resources, the settling parties agree that when CO_2 emissions costs are internalized in 2009 there is unlikely be a need to develop a ranking process that treats environmental impacts separately from revenue requirements. In addition, the settling parties agree that the inclusion of forward capacity market credits in the revenue requirements calculation eliminates the need to consider availability at system peak as a separate and independent criterion in the ranking process.

In order to rank projects that serve different purposes or differ in size, the settling parties agree that the ranking process will be based on the ratio of net revenue requirements to market purchases for each option, with both quantities expressed in net present value terms. Projects with ratios less than one would be deemed economic relative to market purchases. Those with lower ratios would be viewed as having greater value to customers per dollar of expenditure than those with higher ratios and hence would be ranked higher.

4. Merrimack Continued Unit Operation Study. Given the Commission's decision to open a docket to investigate issues related to the installation of scrubber technology at Merrimack Station, the settling parties agree, pending the outcome of that investigation, to withhold further comment in this proceeding on the Merrimack continuing unit operation issue.

5. Newington Operational Analysis. In its next LCIRP filing, PSNH's operational analysis of the Newington unit will be based on the forward price of fuel oil.

6. Wholesale Price Forecast. The settling parties agree that the wholesale price forecasts will be based on a production cost simulation model whenever such forecasts are used to justify significant investment decisions. In addition, natural gas prices used in the development of

wholesale price forecasts, to justify significant investment decisions or otherwise, will reflect historical price differences between the market delivery point chosen as the basis of the forecast and the appropriate delivery point in New England.

IV. ADDITIONAL ISSUES AT HEARING

At hearing, TransCanada, Freedom and Halifax questioned PSNH witnesses concerning PSNH's decision not to include divestiture and retirement of the Merrimack Station generating facility as options in its supply-side assessment. PSNH stated that such issues are governed by RSA 369-B:3-a and are not required as part of an LCIRP based upon Order No. 24,695. Nevertheless, TransCanada, Freedom and Halifax recommended in their closing statements that the Commission require PSNH to do a continuing operation study as well as analysis of divestiture in the next LCIRP. The intervenors argued that requiring PSNH to analyze new generation options without also looking at retirement or divestiture of existing generation was contrary to the basic principles of least cost planning.

The OCA opposed the position of PSNH and Staff that "non-quantified benefits" (i.e., environmental and other benefits) be excluded from the Total Resource Cost test used to determine the cost effectiveness of demand-side resources. The OCA argued that any change in the adder should be made in a CORE energy efficiency docket rather than in PSNH's LCIRP docket. The OCA also argued that PSNH ought to conduct a continuing operations study on Merrimack station due to the increased costs of the proposed scrubber project as well as increases in other environmental compliance costs.

V. COMMISSION ANALYSIS

A. Adequacy of 2007 LCIRP

RSA 378:39 requires us to evaluate an electric utility's proposed integrated least cost resource plan in order to "evaluate the adequacy of [the] utility's planning process." Although

some aspects of the retail electric market in New Hampshire have changed as a result of the restructuring of the electric utility industry, RSA 374-F, PSNH retains its fossil and hydro generation facilities and continues to supply power to its customers through those facilities. RSA 369-B:3-a. As a result, the primary objective of an integrated least cost resource plan for PSNH remains the same: namely, to develop and implement an integrated resource plan that satisfies customer energy service needs at the lowest overall cost consistent with maintaining supply reliability. *See Public Service Co. of New Hampshire*, 73 NH PUC 117, 126 (1988).

In addition to the general LCIRP requirements found in RSA 378:38, in PSNH's last LCIRP proceeding PSNH was directed to address some specific issues in its next LCIRP:

> (1) electric energy and demand forecast for delivery and energy services under high, low and base case scenarios;
>
> (2) the resource balance over the planning period, including an assessment of PSNH's base-load, intermediate and peaking needs;
>
> (3) a systematic evaluation of reasonably available demand-side resources plus a description of the avoided cost methodology and associated avoided cost forecast used for evaluation purposes;
>
> (4) generic cost information relating to the construction or acquisition of new generation capacity;
>
> (5) a description of the process (including the results of any evaluations) used by PSNH, to select the mix of demand-side and supply-side resources included in the resource plan; and
>
> (6) the resource plan with which PSNH proposes to fill the resource balance at the lowest cost. Order No. 24,695 (November 8, 2006) at 24.

Based on our review of its filing, and in light of the Partial Settlement Agreement, we find PSNH's 2007 LCIRP to be adequate for purposes of RSA 38:39 and :40, and generally compliant with Order No. 24,695. Nevertheless, we provide further guidance below regarding PSNH's next LCIRP, which we direct PSNH to file one year from the date of this order.

B. Modifications Required in Next LCIRP Filing

1. Analysis of Demand-Side Potential. In its next LCIRP, PSNH shall base its assessment of demand-side resources on the results of the report on "Additional Opportunities for Energy Efficiency in New Hampshire" by GDS Associates, the consultant hired by the Commission to investigate the potential for energy efficiency in New Hampshire, subject to updates and amendments to the data which may be subsequently undertaken at the PUC. We note that the study identified thermal energy storage for air conditioning loads as a potential demand side measure to reduce peak loads, but it did not analyze the costs or benefits of such. PSNH should assess commercially available off-peak cooling with thermal energy storage as a potential demand-side resource as part of their next LCIRP and should also consider other energy storage technologies as they emerge as commercially viable options to meet various electric system needs. PSNH should also use the latest available avoided energy supply cost study for New England in its next LCIRP. To the extent PSNH determines that any of the potential demand-side opportunities in the consultants' report are not appropriate for its franchise area, we direct PSNH in its next LCIRP to explain with supporting documentation or studies (such as cost/benefit analyses), why its demand-side resource plan does not take into account the potential associated with such resource opportunities.

2. Analysis of Demand Response Programs. In its next LCIRP, PSNH shall include in its economic analysis of demand response programs only those incremental capital costs and incremental administrative expenses incurred by PSNH to implement such programs. In its next LCIRP PSNH shall perform an assessment of the savings in transmission or distribution costs associated with demand response programs. The results of the assessment will also be reflected in the economic analysis of the demand response programs included in the next filing.

3. Total Resource Cost Test for Demand-Side Measures. We will continue our policy of not including environmental adders in the Total Resource Cost test used to determine the cost effectiveness of energy efficiency and demand response programs, with the exception of calling for a sensitivity analysis using a higher than market cost of CO_2. See Order No. 24,695 at 27. We base this decision on the fact that the major costs of power plant emissions (NO_X, SO_2, Mercury and CO_2) are already included in the avoided costs that underlie the cost effectiveness test for Core energy efficiency programs. Including an adder that reflects the benefits of reducing these emissions would amount to overstating the benefits of energy efficiency, potentially resulting in the adoption of programs that in reality are uneconomic. However, the most recent avoided energy supply cost study for New England only internalizes the projected trading price of carbon allowances under anticipated regulations in projected electricity supply costs. The study notes that the value of CO_2 based on sustainability targets is quite a bit higher and that anticipated regulations are only gradually incorporating climate externalities. We direct PSNH to do a sensitivity analysis of the Total Resource Cost test using a reasonable forecast of the full cost of CO_2 using climate sustainability targets for CO_2 to identify those options that may be robust under both scenarios and others that may make sense under one scenario but not the other. Regarding non-environmental benefits of reduced consumption, we do not believe it would be appropriate to consider any alternative to our policy absent identification of these "other benefits" and development of reasonable estimates of the costs to consumers of not reducing usage further.

4. Supply-side Analysis of Biomass and Wind Units. In its next LCIRP filing, PSNH's economic analysis shall include, in addition to the costs included in the 2007 LCIRP, the costs

of: land; capital additions; and transmission. PSNH will also provide a fully supported biomass fuel price forecast with base case, high and low scenarios.

5. Supply-side Analysis of Solar Photovoltaic. In its next LCIRP filing, PSNH shall prepare its economic analysis based upon existing tax law applicable to utilities. PSNH's analysis will include estimates of operating and maintenance expense including a factor for the degradation in the output of the photovoltaic device over time.

6. Ranking of Supply-side Resource Options. As market CO_2 emissions costs are internalized in 2009 there is less of a need to develop a ranking process that treats environmental impacts separately from revenue requirements. In its next LCIRP filing, PSNH's ranking of supply-side options shall be based upon a revenue requirements analysis. However, PSNH is directed to prepare a sensitivity analysis of supply-side resource options using a reasonable forecast of the full cost of CO_2 using climate sustainability targets for CO_2, as discussed in paragraph 3 above concerning the Total Resource Cost Test for Demand-Side Measures, to help understand how full internalization of potential CO_2 costs might change the ranking of options. Fuel diversity, price stability, transmission stability, and statewide or local economic benefit may be used as tie breakers in the ranking analysis. The inclusion of forward capacity market credits in the revenue requirements calculation eliminates the need to consider availability at system peak as an independent criterion in the ranking process. In order to rank projects that serve different purposes or differ in size, the ranking process will be based on the ratio of net revenue requirements to market purchases for each option, with both quantities expressed in net present value terms.

7. Merrimack Continued Unit Operation Study.

Early retirement of existing power plants for economic reasons is a practical option for utility planners if continued operation entails the expenditure of significant investment dollars. For this reason, we will require PSNH to include in future LCIRPs an economic analysis of retirement for any unit in which the alternative is the investment of significant sums to meet new emissions standards and/or enhance or maintain plant performance. PSNH will not, however, be required to include an analysis of divestiture in its next LCIRP as set forth in Order No. 24,695.

8. Newington Operational Analysis. In its next LCIRP, PSNH's operational analysis of the Newington unit shall be based on the forward price of fuel oil.

9. Wholesale Price Forecast. In its next LCIRP, PSNH's wholesale price forecasts will be based on a production cost simulation model whenever wholesale price forecasts are used to justify significant investment decisions. In addition, natural gas prices used in the development of wholesale price forecasts will reflect historical price differences between the market delivery point chosen as the basis of the forecast and the appropriate market delivery point in New England.

10. In General. In light of the emerging commercialization of plug-in electric vehicles and national public policy discussions about encouraging the production and deployment of electric vehicles, including hybrids, we direct PSNH to explicitly consider the implications of potential plug-in electric vehicle market penetration in their next LCIRP.

C. PSNH Motions for Confidential Treatment

Pursuant to RSA 91-A:5, IV and N.H. Code Admin. Rules Puc § 203.08, PSNH requests confidential treatment for: (1) supply-side work papers; (2) forward coal prices; (3) computer models to estimate revenue requirements; (4) a study by R W Beck of biomass plant costs; and (5) Newington cost assumptions.

The New Hampshire Right-to-Know Law provides each citizen with the right to inspect all public records in the possession of the Commission. *See* RSA 91-A:4, I. The statute contains an exception, invoked here, for "confidential, commercial, or financial information." RSA 91-A:5, IV. In *Union Leader Corp. v. New Hampshire Housing Finance Authority*, 142 N.H. 540 (1997), the New Hampshire Supreme Court provided a framework for analyzing requests to employ this exception and to shield from public disclosure documents that would otherwise be deemed public records. There must be a determination of whether the information is confidential, commercial or financial information "*and* whether disclosure would constitute an invasion of privacy." *Id.* at 552 (emphasis in original, citations omitted). "An expansive construction of these terms must be avoided," lest the exemption "swallow the rule." *Id.* (citations omitted). "Furthermore, the asserted private confidential, commercial, or financial interest must be balanced against the public's interest in disclosure, . . . since these categorical exemptions mean not that the information is *per se* exempt, but rather that it is sufficiently private that it must be balanced against the public's interest in disclosure." *Id.* at 553 (citations omitted).

Puc 203.08 is designed to facilitate the use of this balancing test. We require a motion for confidentiality to contain (1) the specific documents or portions thereof for which confidential treatment is sought, (2) reference to statutory or common law authority favoring confidentiality, (3) a description of the harm that would result from disclosure. Puc 203.08(b).

(1) Supply-Side Work Papers

These work papers were provided to Staff in response to data request TS-01 Q-TS-001 and contain data supporting PSNH's economic evaluation of several generation resource options that were included in the LCIRP. PSNH specifically seeks protection for the analysis and data

behind those evaluations. PSNH states that such data and analysis took substantial time to develop and if disclosed would harm PSNH competitively.

We will deny PSNH's request for confidential treatment of the economic analysis used to evaluate the generation options because we find that PSNH has not demonstrated competitive harm as a result of disclosure, inasmuch as the resources involved provide a regulated service. We will also deny PSNH's request for confidential treatment of the data used in the analysis. PSNH argues that such data "were the result of significant effort by many individuals throughout the Company. Reproduction of this material would be very time consuming and involve substantial resources." The data, however, has already been assembled and presented to Staff in the form of a data response. Presenting this information to other parties involves no more work than making an electronic copy and attaching it to an e-mail. In addition, we conclude that the concern that the Company would be competitively disadvantaged by making the information generally available is diminished by the fact that the data is not site specific and is used to support PSNH's planning process rather than an actual investment decision.

(2) Forward Coal Prices

The coal price projection was provided to Staff in data response to Staff 1-21. PSNH alleges that the price projection is confidential commercial information which is exempt from disclosure under RSA 91-A:5, IV. In support of its motion, PSNH says that making the information publicly available would put it at a disadvantage with respect to negotiating future purchases with coal suppliers. We find that PSNH has made the requisite showing to justify confidential treatment of its coal price projection and we grant the pending motion for confidential treatment.

(3) Computer Models

Excel spreadsheets containing the data and formulae used in computer models to estimate the revenue requirements associated with several generation resource options were provided to Staff as attachments to discovery responses. PSNH alleges that the electronic version of this data is confidential commercial information which is exempt from disclosure under RSA 9 1-A: 5, IV. We will deny PSNH's request on the ground that the data and formulae underlying the spreadsheets are the same data and formulae contained in the supply-side work papers addressed above. Further, the fact that the data and formulae are part of a functioning electronic model which can be manipulated to produce different results with different inputs does not place PSNH at a greater competitive disadvantage than if the same information were provided in hard copy.

(4) R.W. Beck Study

R.W. Beck was hired by PSNH to conduct a study of the relative economics of a 50 megawatt biomass plant versus a 25 megawatt plant. On May 14, 2008, PSNH filed a motion requesting confidential treatment of that study. PSNH alleges that the external study is confidential commercial and financial information which is exempt from public disclosure under RSA 91-A:5, IV. Specifically, PSNH says that R.W. Beck sought bids from several major component manufacturers who supplied bids on a confidential basis. Beck subsequently included the bids in the study supplied to PSNH. We find that PSNH has made the requisite showing to justify confidential treatment of the Beck study. For this reason, the pending motion for confidential treatment is granted.

(5) Newington Cost Assumptions

PSNH seeks to protect its assumptions and adders used to compute the cost of running its Newington generation station. PSNH claims that it will be competitively disadvantaged if other

electric suppliers can estimate the cost to run Newington. Such knowledge would allow competitive suppliers to set prices just below the Newington dispatch cost and potentially higher than they would price power absent that information, thus harming PSNH customers. We find that PSNH has made the requisite showing to justify confidential treatment of the Newington assumptions and adders. For this reason the pending motion for confidential treatment is granted.

Based upon the foregoing, it is hereby

ORDERED, that Public Service Company of New Hampshire's revised Least Cost Integrated Resource Plan filed September 28, 2007 and supplemented on March 28, 2008 is accepted; and it is

FURTHER ORDERED, that the Partial Settlement Agreement filed in this proceeding is approved subject to the changes made herein; and it is

FURTHER ORDERED, that Public Service Company of New Hampshire file its next least cost integrated resource plan on or before February 28, 2010, consistent with the determinations made herein; and it is

FURTHER ORDERED, that the motions for confidential treatment submitted by Public Service Company of New Hampshire on April 7, 2008, May 2, 2008 and May 14, 2008 are GRANTED in part and DENIED in part as set forth herein.

By order of the Public Utilities Commission of New Hampshire this twenty-seventh day of February, 2009.

Thomas B. Getz Chairman	Graham J. Morrison Commissioner	Clifton C. Below Commissioner

Attested by:

Kimberly Nolin Smith
Assistant Secretary

Zxafs	Name	Prg Status	Sic1	Year Inv	Pollutant	Description	Est Em (lbs)	Est Em (tons)		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	50000	FORMALDEHYDE	15065.11400	7.532557		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	50000	FORMALDEHYDE	13722.30000	6.86115		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	50000	FORMALDEHYDE	6206.27600	3.103138		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	50000	FORMALDEHYDE	2763.23600	1.381618		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	50000	FORMALDEHYDE	2364.89000	1.182445		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	50000	FORMALDEHYDE	2239.13400	1.119567		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	50000	FORMALDEHYDE	1265.78400	0.632892		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	50000	FORMALDEHYDE	776.92600	0.388463		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	50000	FORMALDEHYDE	309.35000	0.154675		
3300700010	DG WHITEFIELD LLC	O	4911	2007	50000	FORMALDEHYDE	176.13200	0.088066		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	50000	FORMALDEHYDE	0.02060	0.0000103		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	50000	FORMALDEHYDE	0.01536	0.00000768	22.44459	tons
3301500012	PSNH - SCHILLER STATION	O	4911	2007	50328	BENZO(A)PYRENE	3.72200	0.001861		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	50328	BENZO(A)PYRENE	1.63800	0.000819		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	50328	BENZO(A)PYRENE	1.39000	0.000695		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	50328	BENZO(A)PYRENE	1.32400	0.000662		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	50328	BENZO(A)PYRENE	0.74800	0.000374		
3300700010	DG WHITEFIELD LLC	O	4911	2007	50328	BENZO(A)PYRENE	0.10360	0.0000518		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	50328	BENZO(A)PYRENE	0.04880	0.0000244		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	50328	BENZO(A)PYRENE	0.00048	0.000000242	0.00449	tons
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	53703	DIBENZ(A,H)ANTHRACENE	0.03740	0.0000187		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	53703	DIBENZ(A,H)ANTHRACENE	0.01324	0.00000662		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	53703	DIBENZ(A,H)ANTHRACENE	0.00574	0.00000287		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	53703	DIBENZ(A,H)ANTHRACENE	0.00486	0.00000243		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	53703	DIBENZ(A,H)ANTHRACENE	0.00464	0.00000232		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	53703	DIBENZ(A,H)ANTHRACENE	0.00262	0.00000131		
3300700010	DG WHITEFIELD LLC	O	4911	2007	53703	DIBENZ(A,H)ANTHRACENE	0.00036	0.000000182	0.000034432	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	56235	CARBON TETRACHLORIDE	62.52200	0.031261		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	56235	CARBON TETRACHLORIDE	28.34800	0.014174		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	56235	CARBON TETRACHLORIDE	24.08400	0.012042		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	56235	CARBON TETRACHLORIDE	22.90400	0.011452		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	56235	CARBON TETRACHLORIDE	12.94800	0.006474		
3300700010	DG WHITEFIELD LLC	O	4911	2007	56235	CARBON TETRACHLORIDE	1.80200	0.000901	0.076304	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.11820	0.0000591		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.10280	0.0000514		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.08980	0.0000449		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.04100	0.0000205		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.03480	0.0000174		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.03300	0.0000165		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	56553	BENZ(A)ANTHRACENE	0.01866	0.00000933		
3300700010	DG WHITEFIELD LLC	O	4911	2007	56553	BENZ(A)ANTHRACENE	0.00260	0.0000013	0.00022043	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	67663	CHLOROFORM	75.87800	0.037939		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	67663	CHLOROFORM	58.51200	0.029256		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	67663	CHLOROFORM	17.65200	0.008826		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	67663	CHLOROFORM	14.97400	0.007487		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	67663	CHLOROFORM	14.25400	0.007127		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	67663	CHLOROFORM	8.05800	0.004029		
3300700010	DG WHITEFIELD LLC	O	4911	2007	67663	CHLOROFORM	1.12200	0.000561	0.095225	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	71432	BENZENE	6270.63400	3.135317		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	71432	BENZENE	2691.77400	1.345887		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	71432	BENZENE	2294.84200	1.147421		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	71432	BENZENE	2178.27200	1.089136		

3301300026	PSNH - MERRIMACK STATION	O	4911	2007	71432	BENZENE	1671.89200	0.835946		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	71432	BENZENE	1231.37800	0.615689		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	71432	BENZENE	273.36000	0.13668		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	71432	BENZENE	231.19200	0.115596		
3300700010	DG WHITEFIELD LLC	O	4911	2007	71432	BENZENE	171.32200	0.085661		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	71432	BENZENE	5.16400	0.002582		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	71432	BENZENE	0.00406	0.00000203		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	71432	BENZENE	0.00302	1.51E-06	8.50991854	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	74839	METHYL BROMIDE	205.77000	0.102885		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	74839	METHYL BROMIDE	53.55400	0.026777		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	74873	METHYL CHLORIDE	681.61400	0.340807		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	74873	METHYL BROMIDE	177.39600	0.088698	0.559167	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	75014	VINYL CHLORIDE	24.91600	0.012458		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	75014	VINYL CHLORIDE	11.33800	0.005669		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	75014	VINYL CHLORIDE	9.63400	0.004817		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	75014	VINYL CHLORIDE	9.16200	0.004581		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	75014	VINYL CHLORIDE	5.18000	0.00259		
3300700010	DG WHITEFIELD LLC	O	4911	2007	75014	VINYL CHLORIDE	0.72200	0.000361	0.030476	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	75070	ACETALDEHYDE	1339.34400	0.669672		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	75070	ACETALDEHYDE	843.25800	0.421629		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	75070	ACETALDEHYDE	773.74400	0.386872		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	75070	ACETALDEHYDE	733.05600	0.366528		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	75070	ACETALDEHYDE	3.14400	0.001572		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	75070	ACETALDEHYDE	2.68200	0.001341		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	75070	ACETALDEHYDE	2.54400	0.001272		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	75070	ACETALDEHYDE	1.43800	0.000719		
3300700010	DG WHITEFIELD LLC	O	4911	2007	75070	ACETALDEHYDE	0.19980	0.0000999	1.8497049	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	75092	METHYLENE CHLORIDE	372.96000	0.18648		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	75092	METHYLENE CHLORIDE	97.06600	0.048533	0.235013	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	75343	ETHYLIDENE DICHLORIDE	51.44400	0.025722		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	75343	ETHYLIDENE DICHLORIDE	13.38800	0.006694	0.032416	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	100425	STYRENE	2750.09200	1.375046		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	100425	STYRENE	1198.19600	0.599098		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	100425	STYRENE	1015.63800	0.507819		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	100425	STYRENE	967.40800	0.483704		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	100425	STYRENE	546.87600	0.273438		
3300700010	DG WHITEFIELD LLC	O	4911	2007	100425	STYRENE	76.04000	0.03802		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	100425	STYRENE	32.15000	0.016075	3.2932	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	100447	BENZYL CHLORIDE	900.24600	0.450123		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	100447	BENZYL CHLORIDE	234.29600	0.117148	0.567271	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	106990	1, 3-BUTADIENE	15.01400	0.007507		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	106990	1, 3-BUTADIENE	8.31600	0.004158		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	106990	1, 3-BUTADIENE	0.00218	0.00000109		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	106990	1, 3-BUTADIENE	0.00196	0.000000982		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	106990	1, 3-BUTADIENE	0.00118	0.000000589		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	106990	1, 3-BUTADIENE	0.00088	0.000000439	0.0116681	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	107028	ACROLEIN	5654.61400	2.827307		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	107028	ACROLEIN	2525.02600	1.262513		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	107028	ACROLEIN	2138.06600	1.069033		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	107028	ACROLEIN	2034.12200	1.017061		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	107028	ACROLEIN	1149.89000	0.574945		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	107028	ACROLEIN	372.96000	0.18648		
3300700010	DG WHITEFIELD LLC	O	4911	2007	107028	ACROLEIN	160.22000	0.08011		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	107028	ACROLEIN	134.90200	0.067451		

3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	107028	ACROLEIN	123.79800	0.061899	7.146799	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	107062	1, 2-DICHLOROETHANE	40.15400	0.020077		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	107062	1, 2-DICHLOROETHANE	18.29400	0.009147		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	107062	1, 2-DICHLOROETHANE	15.49600	0.007748		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	107062	1, 2-DICHLOROETHANE	14.76800	0.007384		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	107062	1, 2-DICHLOROETHANE	8.34800	0.004174		
3300700010	DG WHITEFIELD LLC	O	4911	2007	107062	1, 2-DICHLOROETHANE	1.16200	0.000581	0.049111	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	108883	TOLUENE	2739.80200	1.369901		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	108883	TOLUENE	2516.99800	1.258499		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	108883	TOLUENE	1356.30400	0.678152		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	108883	TOLUENE	581.23200	0.290616		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	108883	TOLUENE	490.77800	0.245389		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	108883	TOLUENE	467.68800	0.233844		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	108883	TOLUENE	308.65600	0.154328		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	108883	TOLUENE	264.38400	0.132192		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	108883	TOLUENE	138.43600	0.069218		
3300700010	DG WHITEFIELD LLC	O	4911	2007	108883	TOLUENE	36.81800	0.018409	4.450548	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	127184	TETRACHLOROETHYLENE	55.30200	0.027651		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	127184	TETRACHLOROETHYLENE	14.39400	0.007197	0.034848	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.14160	0.0000708		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.07840	0.0000392		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.05480	0.0000274		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.04800	0.000024		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.04660	0.0000233		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.04420	0.0000221		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	193395	INDENO(1,2,3,-CD)PYRENE	0.02500	0.0000125		
3300700010	DG WHITEFIELD LLC	O	4911	2007	193395	INDENO(1,2,3,-CD)PYRENE	0.00348	0.00000174	0.00022104	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.17580	0.0000879		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.14140	0.0000707		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.06320	0.0000316		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.05340	0.0000267		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.05100	0.0000255		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.03320	0.0000166		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	205992	BENZO(B)FLUORANTHENE	0.02880	0.0000144		
3300700010	DG WHITEFIELD LLC	O	4911	2007	205992	BENZO(B)FLUORANTHENE	0.00400	0.000002	0.0002754	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	207089	BENZO(K)FLUORANTHENE	0.05000	0.000025		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	207089	BENZO(K)FLUORANTHENE	0.02280	0.0000114		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	207089	BENZO(K)FLUORANTHENE	0.01924	0.00000962		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	207089	BENZO(K)FLUORANTHENE	0.01832	0.00000916		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	207089	BENZO(K)FLUORANTHENE	0.01036	0.00000518		
3300700010	DG WHITEFIELD LLC	O	4911	2007	207089	BENZO(K)FLUORANTHENE	0.00144	0.000000721		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	207089	BENZO(K)FLUORANTHENE	0.00035	0.000000175	0.000061256	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	218019	CHRYSENE	0.12860	0.0000643		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	218019	CHRYSENE	0.08720	0.0000436		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	218019	CHRYSENE	0.05340	0.0000267		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	218019	CHRYSENE	0.02400	0.000012		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	218019	CHRYSENE	0.02040	0.0000102		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	218019	CHRYSENE	0.01934	0.00000967		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	218019	CHRYSENE	0.01094	0.00000547		
3300700010	DG WHITEFIELD LLC	O	4911	2007	218019	CHRYSENE	0.00152	0.000000761	0.000172701	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	1330207	XYLENE	1349.02400	0.674512		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	1330207	XYLENE	1237.99000	0.618995		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	1330207	XYLENE	47.58600	0.023793		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	1330207	XYLENE	47.02400	0.023512		

3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	1330207	XYLENE	15.77000	0.007885		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	1330207	XYLENE	13.36000	0.00668		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	1330207	XYLENE	12.71800	0.006359		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	1330207	XYLENE	7.19000	0.003595		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	1330207	XYLENE	2.42200	0.001211		
3300700010	DG WHITEFIELD LLC	O	4911	2007	1330207	XYLENE	1.00000	0.0005	1.367042	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	1634044	METHYL TERT BUTYL ETHER	45.01200	0.022506		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	1634044	METHYL TERT BUTYL ETHER	11.71600	0.005858	0.028364	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	1746016	2,3,7,8-TCDD	0.00002	0.000000009		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	1746016	2,3,7,8-TCDD	0.00001	5.68E-09		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	1746016	2,3,7,8-TCDD	0.00001	5.51E-09		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	1746016	2,3,7,8-TCDD	4.480E-06	2.24E-09		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	1746016	2,3,7,8-TCDD	0.00000	1.67E-09		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	1746016	2,3,7,8-TCDD	0.00000	1.6E-09		
3300700010	DG WHITEFIELD LLC	O	4911	2007	1746016	2,3,7,8-TCDD	0.00000	1.3E-09		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	1746016	2,3,7,8-TCDD	0.00000	1.27E-09	2.827E-08	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7439921	LEAD	5039.83200	2.519916		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7439921	LEAD	1705.66200	0.852831		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7439921	LEAD	50.03600	0.025018		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7439921	LEAD	21.73000	0.010865		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7439921	LEAD	19.79600	0.009898		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7439921	LEAD	19.08000	0.00954		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7439921	LEAD	12.81400	0.006407		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7439921	LEAD	5.21200	0.002606		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7439921	LEAD	4.45400	0.002227		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7439921	LEAD	0.00103	0.000000516		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7439921	LEAD	0.00077	3.84E-07	3.4393089	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7439965	MANGANESE	5878.39600	2.939198		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7439965	MANGANESE	3075.36600	1.537683		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7439965	MANGANESE	1667.81400	0.833907		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7439965	MANGANESE	724.34000	0.36217		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7439965	MANGANESE	660.49200	0.330246		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7439965	MANGANESE	426.04400	0.213022		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7439965	MANGANESE	295.21000	0.147605		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7439965	MANGANESE	148.16600	0.074083		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7439965	MANGANESE	38.00000	0.019		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7439965	MANGANESE	0.05820	0.0000291		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7439965	MANGANESE	0.04340	0.0000217	6.4569648	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7439976	MERCURY	137.63600	0.068818		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7439976	MERCURY	10.82200	0.005411		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7439976	MERCURY	3.69200	0.001846		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7439976	MERCURY	2.49600	0.001248		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7439976	MERCURY	1.58400	0.000792		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7439976	MERCURY	1.44600	0.000723		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7439976	MERCURY	0.93600	0.000468		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7439976	MERCURY	0.44600	2.23E-04		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7439976	MERCURY	0.32400	0.000162		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7439976	MERCURY	0.00009	4.42E-08		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7439976	MERCURY	0.00007	3.29E-08	0.079291077	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7440020	NICKEL	3362.95200	1.681476		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7440020	NICKEL	1138.16400	0.569082		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7440020	NICKEL	1056.42400	0.528212		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7440020	NICKEL	34.41000	0.017205		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7440020	NICKEL	14.94000	0.00747		

3300700010	DG WHITEFIELD LLC	O	4911	2007	7440020	NICKEL	13.61600	0.006808		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7440020	NICKEL	8.81000	0.004405		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7440020	NICKEL	3.05000	0.001525		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7440020	NICKEL	1.71200	0.000856		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7440020	NICKEL	0.00034	0.00000017		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7440020	NICKEL	0.00025	0.000000126	2.817039296	
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7440382	ARSENIC	22.97200	0.011486		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7440382	ARSENIC	17.79000	0.008895		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7440382	ARSENIC	16.61600	0.008308		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7440382	ARSENIC	9.96000	0.00498		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7440382	ARSENIC	9.08400	0.004542		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7440382	ARSENIC	5.86200	0.002931		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7440382	ARSENIC	4.09400	0.002047		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7440382	ARSENIC	2.03600	0.001018		
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7440382	ARSENIC	0.00956	0.00000478		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7440382	ARSENIC	0.00081	0.000000405		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7440382	ARSENIC	0.00060	3.02E-07	0.044212487	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7440417	BERYLLIUM	251.53800	0.125769		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7440417	BERYLLIUM	83.31800	0.041659		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7440417	BERYLLIUM	1.16200	0.000581		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7440417	BERYLLIUM	0.49800	2.49E-04		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7440417	BERYLLIUM	0.45400	0.000227		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7440417	BERYLLIUM	0.41600	0.000208		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7440417	BERYLLIUM	0.29200	0.000146		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7440417	BERYLLIUM	0.11540	0.0000577		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7440417	BERYLLIUM	0.10200	0.000051		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7440417	BERYLLIUM	0.00002	1.14E-08		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7440417	BERYLLIUM	0.00002	8.50E-09	0.16894772	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7440439	CADMIUM	610.76800	0.305384		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7440439	CADMIUM	203.43400	0.101717		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7440439	CADMIUM	5.19400	0.002597		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7440439	CADMIUM	4.27200	0.002136		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7440439	CADMIUM	1.86600	0.000933		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7440439	CADMIUM	1.78800	0.000894		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7440439	CADMIUM	1.69200	0.000846		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7440439	CADMIUM	1.09600	0.000548		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7440439	CADMIUM	0.37800	0.000189		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7440439	CADMIUM	0.00035	1.77E-07		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7440439	CADMIUM	0.00026	0.000000132	0.415244309	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7440473	CHROMIUM	3122.29800	1.561149		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7440473	CHROMIUM	1047.90200	0.523951		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	7440473	CHROMIUM	21.90600	0.010953		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	7440473	CHROMIUM	10.83800	0.005419		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	7440473	CHROMIUM	9.50800	0.004754		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7440473	CHROMIUM	8.65800	0.004329		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	7440473	CHROMIUM	5.60600	0.002803		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7440473	CHROMIUM	4.09400	0.002047		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	7440473	CHROMIUM	1.87600	0.000938		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	7440473	CHROMIUM	0.00081	4.05E-07		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	7440473	CHROMIUM	0.00060	0.000000302	2.116343707	
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	7664417	AMMONIA	140282.02000	70.14101		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	7664417	AMMONIA	35207.92000	17.60396		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	7664417	AMMONIA	18643.91400	9.321957		
3300700010	DG WHITEFIELD LLC	O	4911	2007	7664417	AMMONIA	9102.59000	4.551295		

3301300026	PSNH - MERRIMACK STATION	O	4911	2007	7664417	AMMONIA	1796.33000	0.898165	102.516387
3301500012	PSNH - SCHILLER STATION	O	4911	2007	51207319	2,3,7,8-TCDF	0.00070	0.00000035	
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	51207319	2,3,7,8-TCDF	0.00043	0.000000216	
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	51207319	2,3,7,8-TCDF	0.00032	0.000000161	
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	51207319	2,3,7,8-TCDF	0.00031	0.000000153	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	51207319	2,3,7,8-TCDF	0.00028	0.00000014	
3300700010	DG WHITEFIELD LLC	O	4911	2007	51207319	2,3,7,8-TCDF	0.00025	0.000000125	
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	51207319	2,3,7,8-TCDF	0.00024	0.000000122	
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	51207319	2,3,7,8-TCDF	0.00001	3.91E-09	1.27091E-06
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	CO			318.9816	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	CO			321.9524	
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	CO			299.2199	
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	CO			292.5743	
3300700010	DG WHITEFIELD LLC	O	4911	2007	CO			235.0045	
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	CO			217.4701	
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	CO			211.4584	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	CO			134.0228	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	CO			102.0876	
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	CO			62.33213	
3300700087	PSNH - LOST NATION STATION	O	4911	2007	CO			0.065648	
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	CO			0.016208	2195.185586
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	CO2			3726216.2	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	CO2			1301732.6	
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	CO2			1191488	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	CO2			1282580.5	
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	CO2			343495.4	7845512.7
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	NO2			3227.933	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	NO2			922.551	
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	NO2			418.8906	
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	NO2			338.538	
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	NO2			221.2471	
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	NO2			209.3313	
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	NO2			153.2879	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	NO2			99.93836	
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	NO2			83.09933	
3300700010	DG WHITEFIELD LLC	O	4911	2007	NO2			74.42963	
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	NO2			3.540772	
3300700087	PSNH - LOST NATION STATION	O	4911	2007	NO2			2.418432	5755.205424
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	PM10			237.9683	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	PM10			146.9916	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	PM10			76.59937	
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	PM10			63.40107	
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	PM10			41.01757	
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	PM10			11.9189	
3300700010	DG WHITEFIELD LLC	O	4911	2007	PM10			11.22436	
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	PM10			9.562444	
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	PM10			5.287141	
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	PM10			1.851963	
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	PM10			0.020997	
3300700087	PSNH - LOST NATION STATION	O	4911	2007	PM10			0.019542	605.863257
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	PM2.5			236.9309	
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	PM2.5			76.59933	
3301500012	PSNH - SCHILLER STATION	O	4911	2007	PM2.5			64.57815	
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	PM2.5			41.19884	

3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	PM2.5			36.22745		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	PM2.5			10.83057		
3300700010	DG WHITEFIELD LLC	O	4911	2007	PM2.5			10.2068		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	PM2.5			9.562444		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	PM2.5			4.646415		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	PM2.5			1.668503		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	PM2.5			0.020997		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	PM2.5			0.01865	492.489049	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	PT			656.3909		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	PT			219.0653		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	PT			100.6538		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	PT			76.5343		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	PT			54.56124		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	PT			15.10081		
3300700010	DG WHITEFIELD LLC	O	4911	2007	PT			14.09205		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	PT			9.562444		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	PT			7.209552		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	PT			2.502544		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	PT			0.020997		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	PT			0.01876	1155.712697	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	SO2			36484.28		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	SO2			3749.715		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	SO2			2273.449		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	SO2			24.60069		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	SO2			20.42844		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	SO2			14.02423		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	SO2			12.0258		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	SO2			8.941594		
3300700010	DG WHITEFIELD LLC	O	4911	2007	SO2			6.949943		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	SO2			6.001024		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	SO2			1.139368		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	SO2			0.07532	42601.63041	
3301300026	PSNH - MERRIMACK STATION	O	4911	2007	VOC			70.73907		
3301500012	PSNH - SCHILLER STATION	O	4911	2007	VOC			21.98652		
3301500054	PSNH - NEWINGTON STATION	O	4911	2007	VOC			9.330853		
3301590782	GRANITE RIDGE ENERGY LLC	O	4911	2007	VOC			6.570768		
3300900026	PINETREE POWER - BETHLEHEM	O	4911	2007	VOC			5.361492		
3300900021	BRIDGEWATER POWER COMPANY	O	4911	2007	VOC			4.562461		
3300300019	PINETREE POWER - TAMWORTH	O	4911	2007	VOC			4.327193		
3301900031	SPRINGFIELD POWER LLC	O	4911	2006	VOC			2.538922		
3301590793	NEWINGTON ENERGY LLC	O	4911	2007	VOC			1.171322		
3300700010	DG WHITEFIELD LLC	O	4911	2007	VOC			0.353656		
3300700087	PSNH - LOST NATION STATION	O	4911	2007	VOC			0.006523		
3300300014	PSNH - WHITE LAKE STATION	O	4911	2007	VOC			0.001842	126.950622	

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89	A	G	6/6/2001	Cape Wind Turbine Generators	WT	WND	462	462	462	N/A	MA	11/30/2010	6/30/2009	Near Barnstable 115 kV Substation	MIS	Y	Y	ISO-NE		SEMA
95	A	G	11/21/2001	Kleen Energy Project	CC	NG, DFO	620	619.8	620.0	Middlesex	CT	11/30/2010	6/28/2010	Sectionalize 353 Line	MIS	Y	Y	ISO-NE		CT
104	A	G	3/06/2003	Waterside Power - 180 MW	GT	NG, DFO	180	203.9	207.2	Fairfield	CT	6/1/2010	3/6/2010	Waterside 115 kV	MIS	Y	Y	ISO-NE		NOR
108	A	G	5/12/2003	Hoosac Wind Project	WT	WND	28.5	30	30	Berkshire &	MA	12/31/2010	10/1/2010	Line Y25S	MIS	Y	Y	NGRID		WMA
125	A	G	11/2/2004	Norwalk Harbor Station Redevelopment	GT	KER		322.5	330	Fairfield	CT	1/31/2010	12/31/2009	Norwalk 345 kV Station	MIS			ISO-NE		NOR
135	A	G	8/19/2005	Biomass	ST	WDS		55	55	Hampden	MA	6/30/2011	2/28/2011	Blanford - Southwick - Elm 115 kV line	MIS	Y	Y	ISO-NE		WMA
137	A	G	9/23/2005	Hydro	HD	WAT		N/A	N/A	Oxford	ME	TBD	TBD	CMP 115 kV switchyard located on Falls Hill, Rumford, ME	MIS	Y	Y	ISO-NE		ME
138	A	G	9/26/2005	Kibby Wind Project	WT	WND		65	65	Franklin	ME	10/1/2009	9/30/2009	Bigelow Substation	MIS	Y	Y	ISO-NE		ME
138	A	G	9/26/2005	Kibby Wind Project	WT	WND		65.5	65.5	Franklin	ME	9/1/2010	8/1/2010	Bigelow Substation	MIS	Y	Y	ISO-NE		ME
139	A	G	10/14/2005	Lowell Power Generators	GT	NG		99	99	Middlesex	MA	6/1/2010	4/1/2010	J162 115kV line between Tewksbury and Perry Street	MIS	Y	Y	ISO-NE		CMA
148	A	G	3/6/2006	Comerford Hydro	HD	WAT		169	170	Grafton	NH	11/31/2006 - 11/31/2009	11/31/2006 - 11/31/2009	NGRID Comerford Substation	MIS	Y	Y	ISO-NE		NH
150	A	G	5/25/2006	Plainfield Renewable Energy Project	ST	WDS		37.5	38.5	Windham	CT	3/31/2010	11/30/2009	CL&P Fry Brook Substation	MIS	Y	Y	ISO-NE		CT
155	A	G	6/2/2006	Gas Turbine	CT	NG, DFO		120	130	Middlesex	MA	5/1/2011	3/1/2011	NSTAR Mystic Substation	MIS			ISO-NE		BOST
157	A	G	6/21/2006	Billerica Power	GT	NG, Oil		311	341	Middlesex	MA	6/15/2011	5/15/2011	J-162 line to Tewksbury Substation	MIS	Y	Y	ISO-NE		CMA
161	A	G	7/5/2006	Devon 15-18	GT	NG, KER		196.8	196.8	New Haven	CT	6/1/2010	4/1/2010	Devon Substation	MIS	Y	Y	ISO-NE		SWCT
161	A	G	7/5/2006	Gas Turbine	GT	NG, JF, KER		215	211	Middlesex	CT	6/1/2010	4/1/2010	CL&P Middletown Substation or CL&P Scovill Rock Substation	MIS	Y	Y	ISO-NE		CT
161	A	G	7/5/2006	Middletown 11	GT	NG, JF, KER		107.5	110	Middlesex	CT	6/1/2011	4/1/2011	CL&P Middletown Substation	MIS	Y	Y	ISO-NE		CT
161	A	G	7/5/2006	Combined Cycle	CC	NG		630	690	New London	CT	5/31/2013	2/1/2013	Montville Substation	MIS			ISO-NE		CT
163	A	G	7/24/2006	Mirant Kendall Jet 2	GT	JF		18	22	Middlesex	MA	4/15/2009	4/1/2009	Kendall Station in Cambridge	MIS	Y	Y	NSTAR		BOST
164	A	G	8/1/2006	Combined Cycle(see # 201)	GT	NG		158	196	Providence	RI	6/1/2012	12/31/2011	345 kV RISE Substation	MIS			ISO-NE		RI
165	A	G	8/3/2006	Combined Cycle(See # 226)	CC	NG		563	616	Rockingham	NH	6/30/2013	12/31/2012	345 kV Seabrook Substation	MIS			ISO-NE		NH
166	A	G	8/9/2006	Wind	WT	WND		100	100	Coos	NH	12/15/2009	9/15/2009	PSNH W-179 115 kV line	MIS			ISO-NE		NH
170	A	G	8/25/2006	Gas Turbine Capacity Increase (see #155)	CT	NG, DFO		40	55	Middlesex	MA	5/1/2011	3/1/2011	NSTAR Mystic Substation	MIS			ISO-NE		BOST
171	A	G	8/29/2006	Thomas A. Watson Generating Station	GT	NG, DFO		108	115	Norfolk	MA	4/15/2009	3/1/2009	115 kV Potter Substation	MIS	Y	Y	ISO-NE		SEMA
172	A	G	8/29/2006	Sheffield Wind	WT	WND		40	40	Caledonia	VT	11/30/2009	9/1/2009	Irasburg - St. Johnsbury 115 kV	MIS	Y	Y	ISO-NE		VT
174	A	G	10/13/2006	Combined Cycle	CC	NG, DFO		280	280	Hampden	MA	6/1/2012	4/1/2012	345 kV Stony Brook Substation	MIS			ISO-NE		WMA
175	A	G	10/20/2006	Gas Turbine	GT	NG, DFO		175	203.6	Fairfield	CT	6/1/2010	2/1/2010	345 kV line # 321	MIS			ISO-NE		SWCT
178	A	G	11/2/2006	Combined Cycle	CC	NG, DFO		350	425	Plymouth	MA	6/1/2012	12/1/2011	115 kV F19 and E20 lines	MIS	Y	Y			SEMA
181	A	ET	11/9/2006	Transmission Expansion	N/A	N/A		N/A	N/A	N/A	CT	N/A	N/A	Lake Road 345 kV Substation	N/A	Y		ISO-NE		CT
182	A	G	10/20/2006	Gas Turbine Capacity Increase (See queue position #175)	GT	NG, DFO		0	18.4	Fairfield	CT	6/1/2010	2/1/2010	345 kV line # 321	MIS			ISO-NE		SWCT
185	A	G	11/22/2006	Wind	WT	WND		39	39	Penobscot	ME	12/15/2009	11/15/2009	BHE Keene Road 115 kV substation	MIS	Y	Y	ISO-NE		BHE
186	A	G	12/1/2006	Gas Turbine	GT	DFO KER		78	93	New Haven	CT	12/31/2011	10/30/2011	CL&P Shepaug 115 kV substation	MIS			ISO-NE		SWCT
186	A	G	12/1/2006	Hydro	HD	WAT		48	48	New Haven	CT	12/31/2011	10/30/2011	CL&P Shepaug 115 kV substation	MIS			ISO-NE		SWCT
190	A	G	12/22/2006	Gas Turbine	GT	DFO,		156	200	Hampden	MA	1/31/2010	10/30/2009	W Mass. Mt. Tom 115 kV Substation	MIS					WMA
190	A	G	12/22/2006	Gas Turbine	GT	NG,		39	50	New London	CT	1/31/2010	10/30/2009	CL&P Tunnel 115 kV Substation	MIS			ISO-NE		CT
190	A	G	12/22/2006	Gas Turbine	GT	NG,		39	50	Litchfield	CT	1/31/2010	10/30/2009	CL&P Falls Village 69 kV Substation	MIS					CT
190	A	G	12/22/2006	Gas Turbine	GT	NG,		39	50	New Haven	CT	1/31/2010	10/30/2009	CL&P Stevenson 115 kV Substation	MIS			ISO-NE		SWCT
191	A	G	12/22/2006	Biomass Project	ST	WDS		26.25	26.75	Litchfield	CT	11/1/2010	8/1/2010	CL&P 115 kV line #1238	MIS	Y		ISO-NE		CT or SWCT
193	A	G	1/5/2007	Combined Cycle	CC	NG		60	67	New Haven	CT	6/1/2010	4/15/2010	UI Ansonia 115 kV substation	MIS					SWCT
195	A	G	1/9/2007	Gas Turbine	GT	NG KER		24	24	Bristol	MA	6/1/2009	5/1/2009	NSTAR 115 kV line #111	MIS					SEMA
196	A	G	1/16/2007	Pump Storage Capacity Upgrade	PS	WAT		1180	1180	Franklin	MA	6/30/2010	5/31/2010	W. Mass Northfield 345 kV substation	MIS					WMA
197	A	G	1/31/2007	Wind Project	WT	WND		55	55	Oxford	ME	7/1/2010	5/1/2010	115kV Rumford Substation	MIS					ME

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199	A	G	2/21/2007	Waterbury Generating Facility	GT	NG		95.7	98.1	New Haven	CT	7/1/2009	5/1/2009	CL&P Baldwin 115 kV substation	MIS	Y	Y	ISO-NE		SWCT
201	A	G	2/26/2007	Converts queue position 164 to combined cycle facility and increases capacity	CC	NG		162	162	Providence	RI	6/1/2012	12/31/2011	345 kV RISE Substation	MIS			ISO-NE		RI
202	A	G	2/27/2007	Combined Cycle	CC	NG		250	285	Windham	CT	5/31/2012	1/31/2012	CL&P 345 kV Lake Road substation	MIS					RI
207	A	G	4/3/2007	Combined Cycle	CC	NG, DFO		452	540	New Haven	CT	10/1/2010	4/1/2010	CL&P 115 kV lines between Baldwin Junction and Beacon Falls	MIS	Y	Y	ISO-NE		SWCT
212	A	G	5/15/2007	Biomass Project	ST	WDS		45	45	Hillsboro	NH	2/28/2010	12/31/2009	PSNH K-165 115 kV line	MIS					NH
213	A	G	5/15/2007	Gas Turbine	GT	NG		158.5	184.7	Worcester	MA	6/1/2010	2/1/2010	ANP Blackstone 345 kV substation	MIS					RI
215	A	G	5/24/2007	Wind Project	WT	WND		75	75	Oxford	ME	3/1/2010	12/1/2009	CMP 115 kV Rumford Substation	MIS					ME
216	A	G	6/8/2007	Combined Cycle	CC	NG, DFO		244	294	Bristol	MA	3/31/2012	2/28/2012	Cleary 115 kV substation	MIS					SEMA
217	A	G	6/13/2007	Pump Storage Equipment Replacement	PS	WAT		1160	1160	Franklin	MA	6/30/2010	5/31/2010	W. Mass Northfield 345 kV substation	MIS					WMA
221	A	G	7/18/2007	Wind Project	WT	WND		78	78	Penobscot	ME	10/31/2011	9/30/2011	115 kV line between Enfield and James River substation	MIS					BHE
222	A	G	7/16/2007	Combined Cycle	CC	NG, DFO		510	560	New Haven	CT	9/1/2009	6/1/2009	Haddam Neck-Southington 345 kV line	MIS					CT
224	A	G	8/10/2007	Gas Turbine	GT	NG, DFO		42.4	55.2	Franklin	VT	9/30/2009	8/31/2009	Swanson Village 46 kV System	MIS	Y	Y	ISO-NE		VT
225	A	G	8/13/2007	Combined Cycle Capacity Increase (See queue position 202)	CC	NG		161	127	Windham	CT	5/31/2012	1/31/2012	CL&P 345 kV Lake Road substation	MIS					RI
226	A	G	9/5/2007	Combined Cycle Capacity Increase/ - Generator Change (See queue position 155)	CC	NG		341	394	Rockingham	NH	6/30/2013	12/31/2012	345 kV Seabrook Substation	MIS					NH
227	A	G	9/26/2007	Pump Storage Capacity Upgrade	PS	WAT		333	333	Berkshire	MA	3/31/2011	3/17/2011	Bear Swamp 230 kV Substation	MIS					WMA
227	A	G	9/26/2007	Pump Storage Capacity Upgrade	PS	WAT		333	333	Berkshire	MA	3/30/2012	3/16/2012	Bear Swamp 230 kV Substation	MIS					WMA
228	A	G	10/9/2007	Wind	WT	WND		27	30	Penobscot	ME	12/31/2009	12/31/2009	BHE Keene Road Substation	MIS					BHE
229	A	G	10/15/2007	Biomass Project	ST	WDS		41	41	Coos	NH	5/31/2011	5/31/2011	PSNH 115 kV S136 line	MIS					NH
231	A	G	10/25/2007	Steam Turbine Capacity Uprate	ST	BIT		642	663	Bristol	MA	6/302012	5/31/2012	Brayton Point 345 kV Switchyard	MIS					RI
233	A	G	11/2/2007	Combined Cycle(See queue position #262)	CC	LFG		36.1	36.4	Providence	RI	9/1/2010	7/1/2010	NGRID 115 kV S171 line	MIS					RI
236	A	G	11/30/2007	Combined Cycle	CC	NG, DFO		353	421	Hampden	MA	6/1/2012	2/1/2012	115 kV line between Buck Pond and Pochassic substations-1302 line	MIS					WMA
237	A	G	12/5/2007	Combined Cycle	CC	NG		285	300	Newport	RI	6/1/2012	1/15/2012	115 kV Tiverton Substation	MIS					RI
238	A	G	12/7/2007	Barre Mass Landfill Gas	IC	LFG		1.6	2	Worcester	MA	12/1/2009	11/1/2009	13.8 kV distribution circuit	MIS	Y	Y	ISO-NE		WMA
240	A	G	12/18/2007	Gas Turbine	GT	NG, KER		94	98	New London	CT	6/1/2010	4/1/2010	Montville Substation	MIS					CT
241	A	G	12/31/2007	Combined Cycle Capacity Increase (See queue position 207)	CC	NG, DFO		489	557	New Haven	CT	1/1/2011	6/1/2010	CL&P 115 kV lines between Baldwin Junction and Beacon Falls	MIS					SWCT
242	A	G	1/3/2008	Biomass Project	ST	WDS		50	50	Cheshire	NH	6/30/2011	4/30/2011	PSNH 115 kV N186 circuit	MIS					NH
243	A	G	1/4/2008	Increase to Steam Turbine Capacity Uprate (See queue position 231)	ST	BIT		648	669	Bristol	MA	6/302012	5/31/2012	Brayton Point 345 kV Switchyard	MIS					RI
244	A	G	1/3/2008	Wind	WT	WND		148	148	Somerset	ME	12/1/2010	10/1/2010	CMP 115 kV Wyman substation or 115 kV 215 line	MIS					ME
245	A	G	1/11/2008	Wind	WT	WND		24	24	Washington	ME	12/31/2009	12/31/2009	BHE Keene Road Substation	MIS					BHE

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247	A	G	1/31/2008	Reconnect Existing Hydro	HD	WAT		4.1	4.1	Orleans	VT	5/1/2009	5/1/2009	VELCO Newport Substation 46 kV bus	MIS					VT
247	A	G	1/31/2008	Diesel generation	IC	DFO		10.3	10.3	Orleans	VT	5/1/2009	5/1/2009	VELCO Newport Substation 46 kV bus	MIS					VT
248	A	G	1/13/2008	Gas Turbine	GT	NG, DFO		178	200	New Haven	CT	6/1/2011	3/1/2011	UI East shore Substation 115 kV bus	MIS					CT
249	A	G	2/4/2008	Wind Capacity Increase- see # 245	WT	WND		30	30	Washington	ME	12/31/2009	12/31/2009	BHE Keene Road Substation	MIS					BHE
251	A	G	2/15/2008	Biomass Project	ST	WDS		61	64	Coos	NH	12/1/2009	11/15/2009	PSNH Eastside(Berlin) Substation	MIS					NH
253	A	G	3/11/2008	Combined Cycle	CC	DFO		269	310	Fairfield	CT	6/1/2011	2/1/2011	CL&P 115 kV 1876 line	MIS					SWCT
254	A	G	3/10/2008	Wind	WT	WND		19.5	19.5	Penobscot	ME	11/1/2010	11/1/2010	CMP 115 kV line # 203	MIS					ME
255	A	G	3/31/2008	Wind	WT	WND		50	50	Grafton	NH	12/31/2010	10/1/2010	TBD	MIS					NH
259	A	G	5/7/2008	Combined Cycle	CC	NG		551	616.3	Providence	RI	6/1/2009	6/1/2009	115 kV RISE Substation	MIS					RI
260	A	G	5/8/2008	Wind	WT	WND		450	450	N/A	RI	12/31/2013	6/30/2012	Brayton Point 115 kV bus or Dexter 115 kV bus	MIS					RI
260	A	G	5/8/2008	Wind	WT	WND		450	450	N/A	RI	12/31/2013	6/30/2012	Kent County 115 kV bus or Davisville 115 kV bus	MIS					RI
262	A	G	5/23/2008	Increase in capacity for queue # 233	CC	LFG		45.9	50.1	Providence	RI	9/1/2010	7/1/2010	NGRID 115 kV S171 line	MIS					RI
263	A	G	5/27/2008	Wind	WT	WND		347	347	Washington	RI	12/1/2012	6/1/2011	West Kingston Substation	MIS					RI
265	A	G	6/16/2008	Gas Turbine	GT	DFO, NG		12.5	14	Suffolk	MA	6/1/2011	5/1/2011	NSTAR Brighton Substation	MIS					BOST
266	A	G	6/19/2008	Wind	WT	WND		34	34	Orleans	VT	12/31/2011	9/15/2011	CVPS Lowell Substation	MIS					VT
267	A	G	6/24/2008	Gas Turbine Capacity Increase (See queue positions #175& #182)	GT	NG, DFO		175	222	Fairfield	CT	6/1/2011	2/1/2011	345 kV line # 321	MIS					SWCT
268	A	G	7/8/2008	Wind (increase in queue position 266)	WT	WND		8.5	8.5	Orleans	VT	12/31/2011	9/15/2011	CVPS Lowell Substation	MIS					VT
269	A	G	7/14/2008	Hydro	HD	WAT		1.2	1.2	Hampden	MA	10/31/2010	10/31/2010	WMELCO 23 kV circuit	MIS					WMA
270	A	G	7/17/2008	Pumped Storage Project	PS	WAT		1000	1000	Wiscasset	ME	6/1/2014	6/1/2014	Maine Yankee 345 kV substation	MIS					ME
271	A	ET	7/30/2008	Two terminal, 1000 MW , 500 kV, dc line	N/A	N/A		N/A	N/A	N/A	N/A	3/31/2014	N/A	Hertel S/S in Quebec or Clay S/S in NY and Norwalk S/S in CT.	N/A					N/A
271	A	ET	7/30/2008	Two terminal, 1000 MW , 500 kV, dc line	N/A	N/A		N/A	N/A	N/A	N/A	3/31/2014	N/A	Hertel S/S in Quebec or Clay S/S in NY and Glenbrook S/S in CT.	N/A					N/A
271	A	ET	7/30/2008	Two terminal, 1000 MW , 500 kV, dc line	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3/31/2014	N/A	Hertel S/S in Quebec or Clay S/S in NY and Singer S/S in CT.	N/A					N/A
271.5	A	TS	8/1/2008	MPS RNS Application	N/A	N/A		TDB	TBD	Aroostook	ME	10/1/2010	N/A	N/A	N/A					BHE & ME
272	A	G	8/1/2008	Wind	WT	WND		64	64	Franklin	ME	8/1/2012	6/1/2012	CMP Rumford or Bigelow Substation	MIS					ME
272	A	G	8/1/2008	Wind	WT	WND		150	150	Aroostook	ME	8/1/2011	5/1/2011	BHE Powersville Substation	MIS					BHE
272	A	G	8/1/2008	Wind	WT	WND		95	95	Somerset	ME	8/1/2012	6/1/2012	CMP 115 KV LINE 222	MIS					ME

ACTIVE - ADMINISTERED TRANSMISSION SYSTEM
Interconnection Requests to the Administered Transmission System
Generation and Elective Transmission Upgrade Requests, and requests for transmission service

Queue Position	Req. Status[1]	Req. Type[1]	Request Date[2]	Project Name	Unit Type	Fuel Type	MW	Summer Net MW	Winter Net MW	County	ST	Projected Commercial Operation Date	Projected Initial Sync. Date	Proposed Point of Interconnection	Inter. Service Type[1]	SIS Com.	I.3.9 Apprvl.	SIS Report or Any Other Studies Available From[3,4]	Any Deviation from Timeline for Current Study[4]	RSP ZONE
272	A	G	8/1/2008	Wind	WT	WND		128	128	Aroostook	ME	12/31/2013	10/31/2013	BHE 345 kV 396 line	MIS					BHE
272	A	G	8/1/2008	Wind	WT	WND		150	150	Aroostook	ME	8/1/2011	5/1/2011	BHE Keene Road Substation	MIS					BHE
273	A	G	8/3/2008	Biomass Project	ST	WDS		35	37	Hampden	MA	6/20/2011	5/20/2011	115 kV line near E. Springfield substation	MIS					WMA
274	A	G	8/7/2008	Gas Turbine	GT	DFO, NG		41.5	48.7	Chittenden	VT	6/1/2011	5/1/2011	GMP Gorge Substation	MIS					VT
274.5	A	TS	8/25/2008	Wind project point-to-point application-100 MW	N/A	N/A	N/A	N/A	N/A	Aroostook	ME	10/1/2011	N/A	N/A	N/A					BHE
276	A	G	9/2/2008	Wind Project	WT	WND		30	30	Bennington	VT	12/30/2010	10/1/2010	Y-25 North, 69 kV line between Searsburg and Bennington	MIS					VT
277	A	G	9/12/2008	Combined Cycle	CC	NG, DFO		695	695	Fairfield	CT	6/1/2013	1/15/2013	CL&P 345 KV 321 line	MIS					SWCT
278	A	ET	9/26/2008	Two terminal, 1000 MW , 500 kV, dc line	N/A	N/A		N/A	N/A	N/A	N/A	3/31/2014	N/A	Maine Yankee Substation, South Boston Substation	N/A					N/A
280	A	G	10/2/2008	Wind	WT	WND		180	180	Coos	NH	9/1/2011	7/1/2011	TBD	MIS					NH
281	A	G	10/6/2008	Wind	WT	WND		85	85	Rutland	VT	9/1/2011	7/1/2001	VELCO 115 kV K34 line	MIS					VT
282	A	G	10/15/2008	Biomass Project	ST	WDS		49.7	51.5	Franklin	MA	7/1/2013	4/1/2013	115 kV line near Montage or Fench King substations	MIS					WMA
283	A	ET	10/20/2008	HVDC Line	N/A	N/A		N/A	N/A	N/A	N/A	3/31/2014	N/A	Orrington ME and BostonMA	N/A					N/A
284	A	G	10/22/2008	Equipment Replacement	ST	NUC		1257	1257	Rockingham	NH	6/30/2013	12/31/2012	345 kV Seabrook Substation	MIS			ISO-NE		NH
285	A	G	10/24/2008	Biomass Project	ST	WDS		35	35	Penobscot	ME	9/30/2009	9/1/2009	BHE Powersville substation	MIS					BHE
286	A	G	12/5/2008	Alternative to queue position 177	GT	NG		187.5	199	Worcester	MA	6/1/2012	2/1/2012	115 kV bus at Millbury substation	MIS					CMA
287	A	G	12/18/2008	Wind	WT	WND		34.5	34.5	Franklin	ME	11/1/2010	10/1/2010	34.5 kV Rumford IP bus	MIS					
288	A	TS	12/18/2008	Local Service Application-87 MW	N/A	N/A		N/A	N/A	Somerset	ME	6/1/2009	N/A	N/A	N/A					ME
290	A	G	1/15/2009	Wind	WT	WND		15	15	Woodstock	ME	11/30/2010	9/30/2010	CMP Woodstock Substation	MIS					ME
291	A	G	1/21/2009	Steam Turbine Uprate	ST	BIT		340	353.5	Merrimack	NH	12/14/2009	N/A	PSNH Merrimack Substation	MIS					NH
292	A	G	1/30/2009	Biomass Project	ST	WDS		49.7	51.5	Berkshire	MA	6/1/2014	3/1/2014	Doreen 115 kV substation or F132 115 kV line	MIS					WMA

Code[1]	Definition		Other Endnotes

ACTIVE - ADMINISTERED TRANSMISSION SYSTEM
Interconnection Requests to the Administered Transmission System
Generation and Elective Transmission Upgrade Requests, and requests for transmission service

Queue Position	Req. Status[1]	Req. Type[1]	Request Date[2]	Project Name	Unit Type	Fuel Type	MW	Summer Net MW	Winter Net MW	County	ST	Projected Commercial Operation Date	Projected Initial Sync. Date	Proposed Point of Interconnection	Inter. Service Type[1]	SIS Com.	I.3.9 Apprvl.	SIS Report or Any Other Studies Available From[3,4]	Any Deviation from Timeline for Current Study[5]	RSP ZONE

Request Status	
C	Commercial
CT	Commercial under temporary approval
W	Withdrawn
A	Actively under study or developing interconnection
FCT	Formerly Commercial under temporary approval

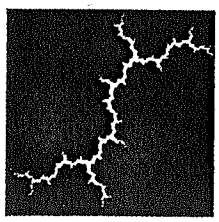
Request Type	
G	Generator Interconnection Request
ET	Elective Transmission Upgrade Interconnection Request
TS	Request for transmission service

Interconnection Service Type	
MIS	Minimum Interconnection Standard

General	
N/A	Not Applicable
TBD	To Be Determined

[2] Application dates have been adjusted as a result of FERC order under Docket # EL 98-69-000
[3] Check OASIS of indicated New England Transmission Owner for details on obtaining report
[4] Contact ISO-NE Customer Service if ISO-NE is indicated at 413-540-4220 or custserv@iso-ne.com
[5] If yes, time to complete study will exceed study timeline in the ISO New England Inc. Open Access Transmission Tariff
[7] Summer & Winter Net MW Ratings are the total capacity of the unit, MW is the capacity of the uprate studied

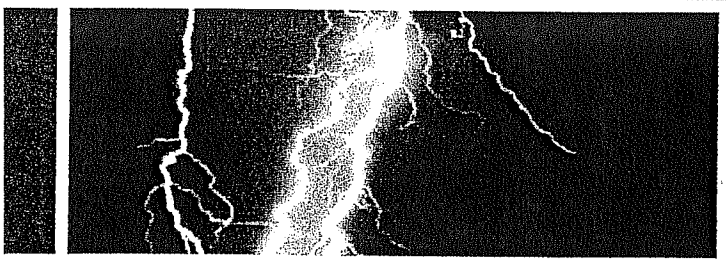
RSP Zone	Definition
BHE	Northeast Maine
ME	Western & Central Maine/Saco Valley, New Hampshire
SME	Southeast Maine
NH	North, East & Central New Hampshire/Eastern Vermont
VT	Vermont/Southwest New Hampshire
BOST	Greater Boston, including North Shore
CMA	Central Massachusetts & Northeast Massachusetts (CMA/NEMA)
WMA	Western Massachusetts
SEMA	Southeast Massachusetts/Newport, Rhode Island
RI	Rhode Island/bordering Massachusetts
CT	North & East Connecticut
SWCT	Southwest Connecticut
NOR	Norwalk/Stamford, Connecticut



Synapse
Energy Economics, Inc.

Initial Report to the New Hampshire Senate Energy, Environment and Economic Development Committee on PSNH's Merrimack Station Scrubber Project

March 20, 2009



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Executive Summary

Background: Synapse Energy Economics, Inc, ("Synapse") was retained to assess the estimated cost of Public Service of New Hampshire's proposed Merrimack Station Scrubber Project and to investigate whether there are less expensive alternatives to the scrubber that would produce local jobs, reduce environmental impact, and avoid the risk of expensive future regulatory costs that would be borne by the citizens of New Hampshire.

Synapse Project Team: Members of the Synapse Project Team include David Schlissel, Christopher James, Dr. David White, Rachel Wilson, Dr. Jeremy Fisher, Dr. David Nichols, Douglas Hurley, Jennifer Kallay, Kenji Takahashi, Peter Lanzalotta and Bill Powers.

The Team's primary findings include:

1. There are technically and economically viable alternatives to the Scrubber Project for reducing the mercury and SO_x emissions from the Merrimack Station that are in regular use at coal-fired power plants around the United States.

2. PSNH significantly understates the possible future cost of power from the Merrimack Station and, therefore, substantially overstates the benefits from the scrubber project. In fact, the future cost of power from the Merrimack Station is likely to be between 10 and 47 percent higher than PSNH has claimed if more reasonable prices are assumed for purchasing carbon dioxide emissions prices under a federal greenhouse gas regulatory program.

3. There are a large number of cost-effective alternatives to generating power at the Merrimack Station, including, but not limited to, purchasing power from the market and energy efficiency.

4. Energy efficiency programs and developing alternative resources would create large numbers of new jobs.

5. PSNH has a significant financial interest in pursuing the Merrimack Station Scrubber Project.

6. PSNH has acknowledged that the contracts it has signed for the Scrubber Project are not "fixed price" contracts.

Finding 1. **There are technically and economically viable alternatives to the Scrubber Project for reducing the mercury and SO_x emissions from the Merrimack Station that are in regular use at coal-fired power plants around the United States.**

There are a number of ways to effectively reduce emissions of Mercury and SO_2 from coal-fired power plants like Merrimack Station in place of installing an expensive scrubber.

For example, a number of coal plants around the country, including plants with cyclone boilers like those at Merrimack Station, burn low sulfur coal and use Activated Carbon Injection to control SO_2 and mercury emissions. A few examples of the coal plants that do so include the Bridgeport Harbor plant (Connecticut), BL England (New Jersey), Powerton (Illinois), Joliet (Illinois), and Kincaid (Illinois). These coal-fired plants have reduced mercury and sulfur emissions, or are in the process of doing so, to meet or exceed their current state regulatory requirements. These state requirements are equal to or more stringent than New Hampshire's Clean Power Act requirements. Illinois' regulation requires 90% mercury reduction. Connecticut's regulation requires compliance with a 0.6 pounds mercury per trillion Btu heat input.

All of the Illinois plants previously listed have cyclone boilers like Merrimack. Because of their strict rule that impacts 57 coal units in that state, there are many more coal units in Illinois subject to strict mercury control requirements that will be using ACI for Hg compliance. In fact, the Institute of Clean Air Companies has reported over 90 ACI systems ordered or in service, many of these for use with low sulfur coal.

Low sulfur coal can be purchased from the Powder River Basin. Some of the plants listed above, and many others, including some on the east coast, have been converted to burn low sulfur Powder River Basin coal. And a number of the plants, such as Powerton, Kincaid and Joliet in Illinois, have cyclone boilers like Merrimack. Other low sulfur coal options include coal from Indonesia and South America, similar to what has been burned at some of the Dominion plants in Massachusetts and the Bridgeport Harbor plant in Connecticut.

If the Merrimack Station were converted to Powder River Basin coal, or another coal with similar sulfur levels, it should be possible to achieve 90 percent mercury removal using ACI and to also reduce SO_2 emissions due to the low sulfur content of the coal. Flue gas from Powder River Basin coal has little or no SO_3 present, in part, because of the low sulfur content. SO_3 is the culprit that poisons activated carbon and is why previous ACI tests at Merrimack showed limited results. Therefore, ACI can be very effective at capturing mercury from flue gas from PRB-fired boilers. Ninety percent reductions in mercury emissions have been achieved on PRB fueled boilers.

The reports on the past tests of ACI at Merrimack show that these tests were run with fuel blends that resulted in mid-to-high sulfur coal. This, combined with the SCR, resulted in high levels of SO_3 in the flue gas. The problem with SO_3 is that it competes with the mercury to be absorbed on the surface of carbon. So, when there are significant levels of SO_3 present, ACI becomes less effective at capturing mercury.

Another option would be to retrofit Merrimack with a fabric filter. A fabric filter would enable high mercury capture with ACI, and potentially little need for the ACI. This option would have higher capital costs than switching to low sulfur coal with ACI, but it would be much less expensive than a scrubber.

Finding 2. PSNH significantly understates the possible future cost of power from the Merrimack Station and, therefore, substantially overstates the benefits from the scrubber project. In fact, if more reasonable prices are assumed for purchasing carbon dioxide emissions prices under a federal greenhouse gas regulatory program, then the future cost of power from the Merrimack Station is likely to be between 10 and 47 percent higher than PSNH has claimed.

PSNH has not adequately quantified the future rate impacts of the Scrubber Project and the relative cost of power from Merrimack Station versus energy efficiency and other alternatives. The most important cost that PSNH has underestimated is the cost of purchasing allowances for future carbon dioxide ("CO_2") emissions in a federal cap-and-trade program.

Federal regulation of greenhouse gas emissions is a matter of when, not if. Both Houses of Congress and the new Obama Administration have stated their intent to adopt a plan to significantly reduce the nation's emissions of greenhouse gases, most particularly, CO_2. The federal government (through the Department of Energy), large financial institutions, and numerous state regulatory commissions, have concluded that it is now necessary to include carbon costs (that is, the price of purchasing CO_2 emissions allowances) in energy resource planning.

The plan proposed by the new Administration is typical of the stringent plans that have been introduced in Congress and would:

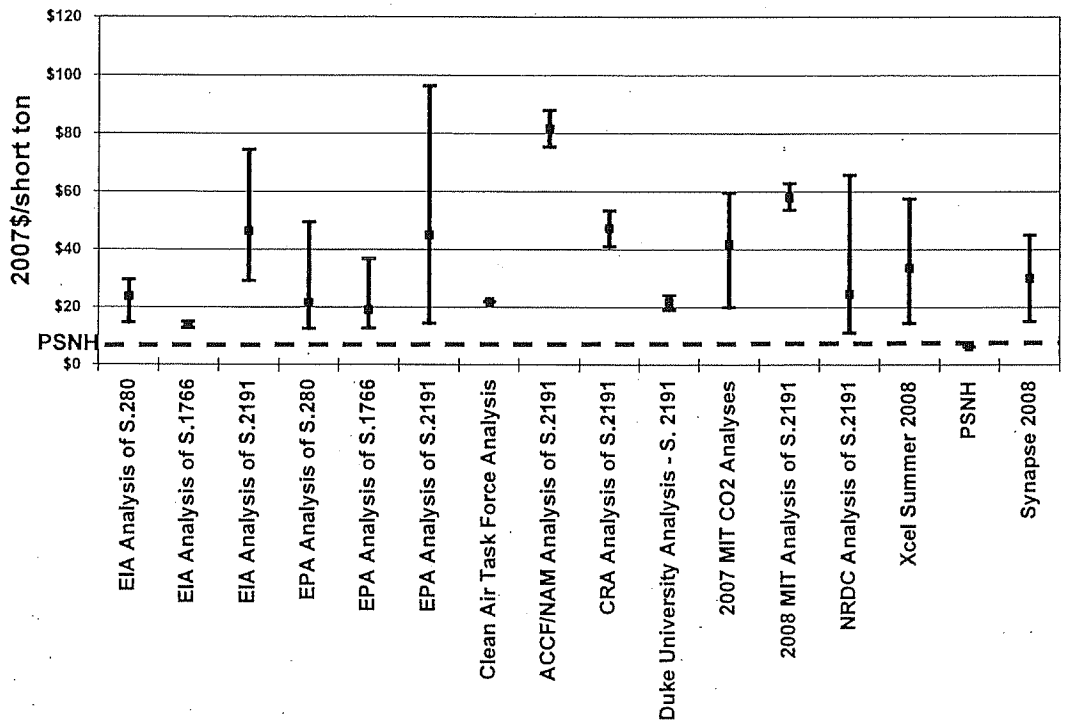
- create a federal cap-and-trade system
- require that CO2 emissions be reduced to 14 percent below 2005 levels by 2020 and 83 percent below 2005 levels by 2050
- auction all emissions allowances – none would be distributed free to generators.

Because there is currently no commercially viable technology for capturing and sequestering the CO_2 emissions from coal-fired power plants and none is anticipated to be available for 10-20 years, companies like PSNH will have to purchase allowances for the CO_2 emitted by their power plants. The estimated cost of such emissions allowances is, therefore, a critical input into the expected future cost of generating power.

PSNH, however, has assumed a price for the cost of future CO_2 regulations that is significantly below the costs projected in objective analyses by the U.S. Department of Energy, the U.S. EPA, the Massachusetts Institute of Technology, and Duke University. The figure below shows the levelized cost estimates for CO_2 allowances as modeled by

these agencies and universities compared to the estimated used by PSNH in its analysis of the future costs for power from the Merrimack Station.

Projected CO2 Emissions Allowance Prices – PSNH vs. Results of Independent Modeling of Climate Change Legislation[1]



As can be seen below, PSNH even has assumed future prices for purchasing CO_2 emissions allowances that are significantly lower than another NU-owned utility, Connecticut Light & Power Company, assumed in its 2008 Integrated Resource Plan filing to the Connecticut Department of Public Utility Control.

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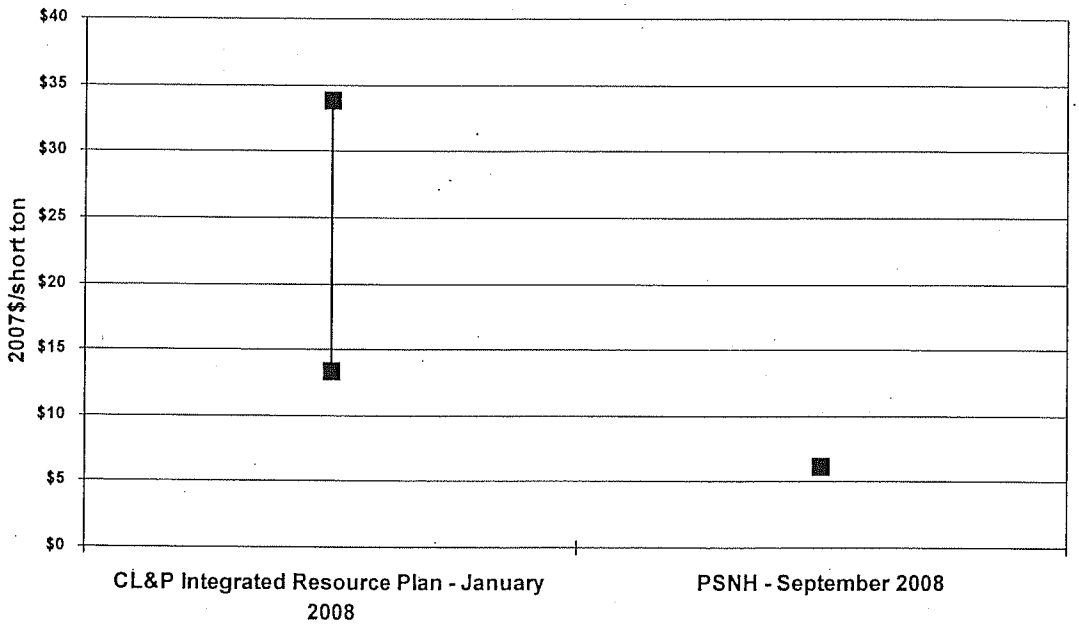
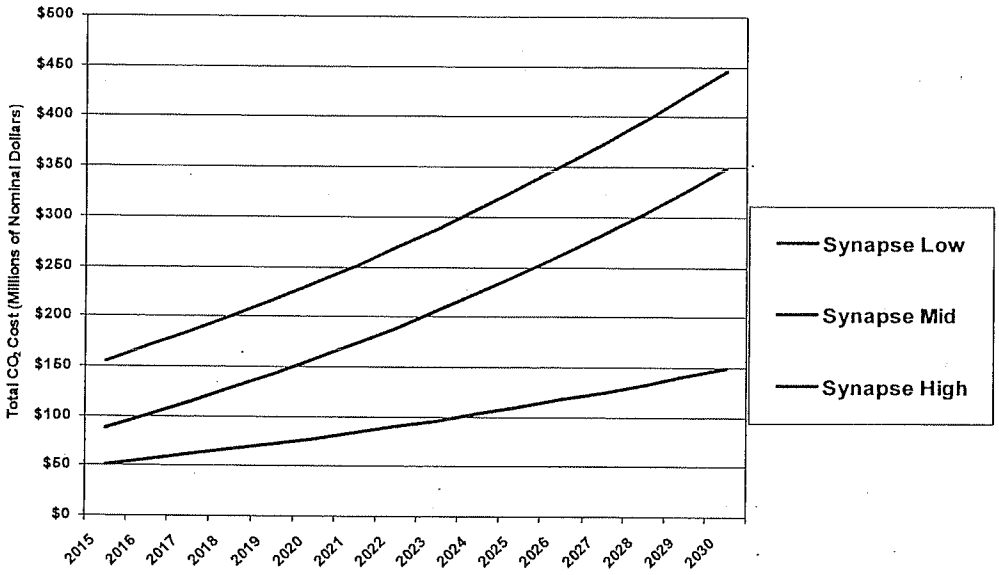
1 See the *Synapse 2008 CO2 Price Forecasts*, July, 2008, for more information on the analyses presented in this figure and the factors underlying the range of future CO2 prices that Synapse recommends be used in resource planning. A copy of this report is available at http://www.synapse-energy.com/Downloads/SynapsePaper.2008-07.0.2008-Carbon-Paper.A0020.pdf.

Assumed CO2 Emissions Allowance Prices – PSNH vs. CL&P



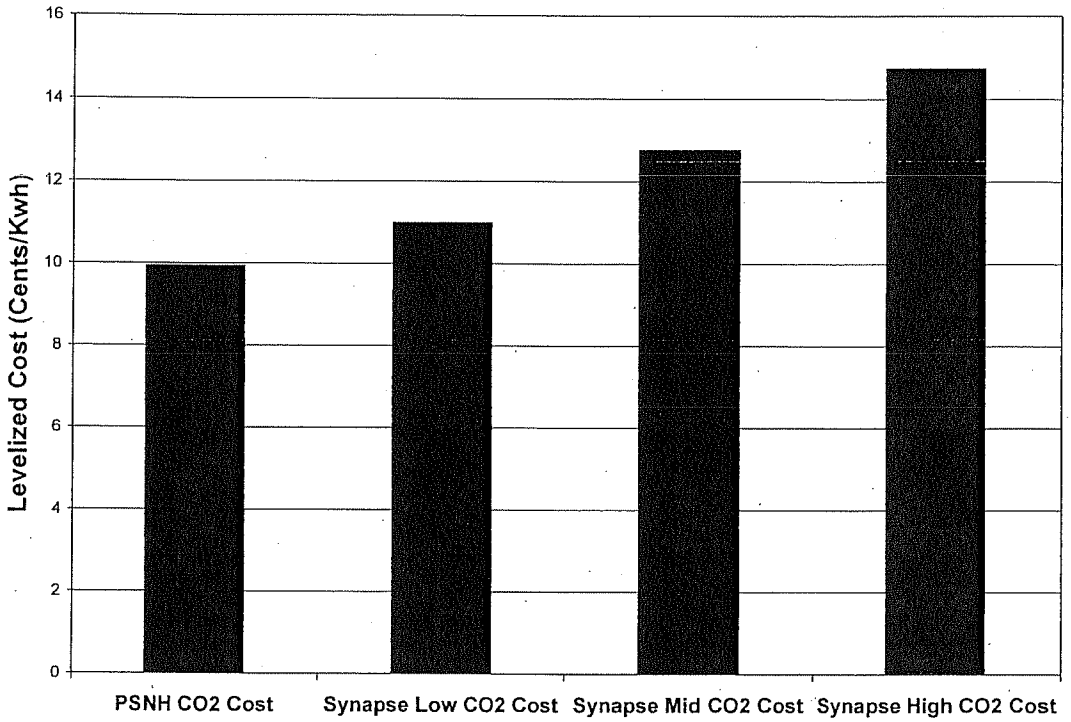
It is therefore clear that when the federal government begins to regulate greenhouse gas emissions, paying for the CO_2 emissions from the Merrimack Station will be very expensive. As shown in the following figure, PSNH's ratepayers can expect to pay between $50 to $150 million in 2015 just for CO_2 emissions allowances with the cost rising to between $110 and $325 million in 2025. It is reasonable to expect that PSNH will seek to pass these costs along to its ratepayers.

Total Annual Expenditures for CO_2 Emissions Allowances under Synapse CO_2 Price Forecasts



The costs presented in this figure were calculated by multiplying the 3.7 million tons of CO_2 that Merrimack Station can be expected to emit each year by the estimated cost of purchasing each emissions allowance (that is, one allowance for each ton of CO_2 emitted). As can be seen, adjusting PSNH's calculations to reflect a more reasonable range of future CO_2 emission allowance prices results in a substantially higher range for the potential cost for power from the Merrimack Station that will then be passed on to the ratepayers.

Cost of Power from Merrimack: PSNH and Synapse Low, Mid and High CO_2 Emission Allowance Prices



In fact, the future levelized cost of power from Merrimack Station is more likely to be in the range of 11 cents to 14.7 cents per kilowatt hour as opposed to the approximately 10 cents per kilowatt hour claimed by PSNH in its September 2008 PUC Filing.

Finally, PSNH also has not accounted for any future costs associated with either an EPA mandated conversion of Merrimack Station to a closed-cycle cooling system or from any new federal coal ash regulations. These costs would raise the cost of power from Merrimack Station even higher than the 11 to 14.7 cents per kilowatt shown above.

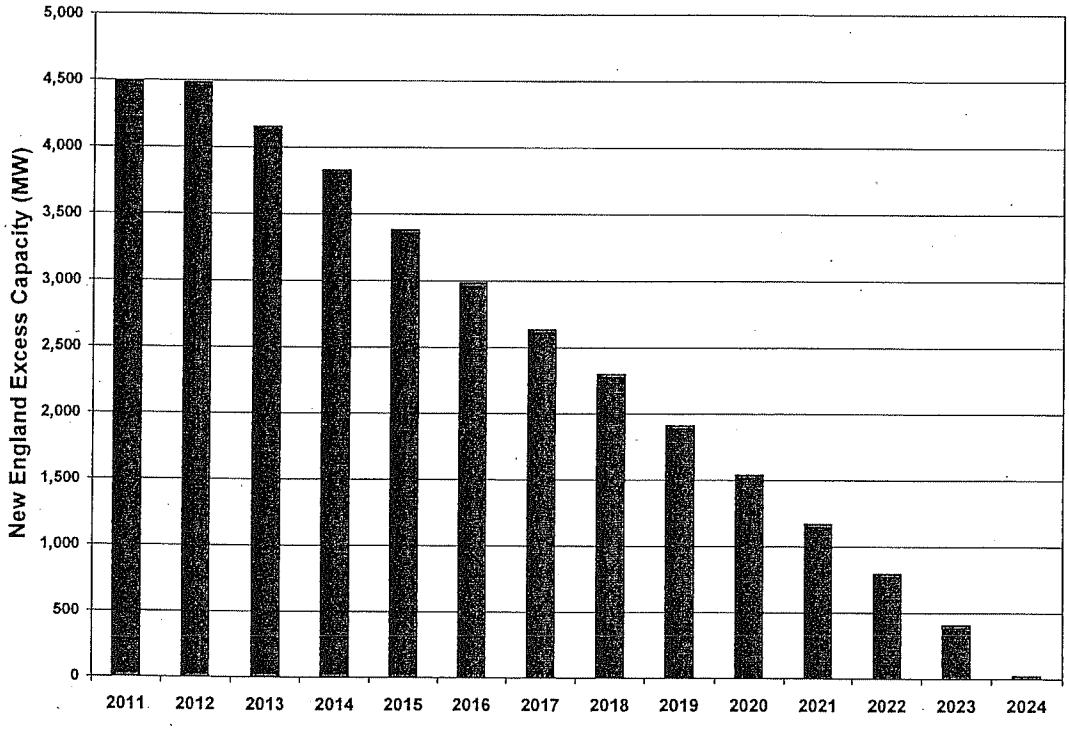
Finding 3. There are a large number of cost-effective alternatives to generating power at the Merrimack Station, including, but not limited to, purchasing power from the market and energy efficiency.

There are a number of lower cost alternatives to generating power at Merrimack Station if the plant were phased out over a reasonable period of time. These alternatives include purchasing power from the market, energy efficiency savings, conversion of one or both units at Merrimack to burn biomass, the addition of other renewable resources, generating more power at existing power plants in the area, building a new combustion turbine or combined cycle facility at the Merrimack Station site and transmission system upgrades.

A. There will be a significant amount of excess capacity in New England that could be used to replace the generation of power at Merrimack Station.

The following figure shows that there will be substantial amounts of excess capacity in New England after 2012 that could be purchased to replace Merrimack Station. In fact, New England can be expected to have more than 500 MW of excess capacity, or more than the capacity of the Merrimack Station, through 2022.

Excess Capacity in New England, 2012-2024



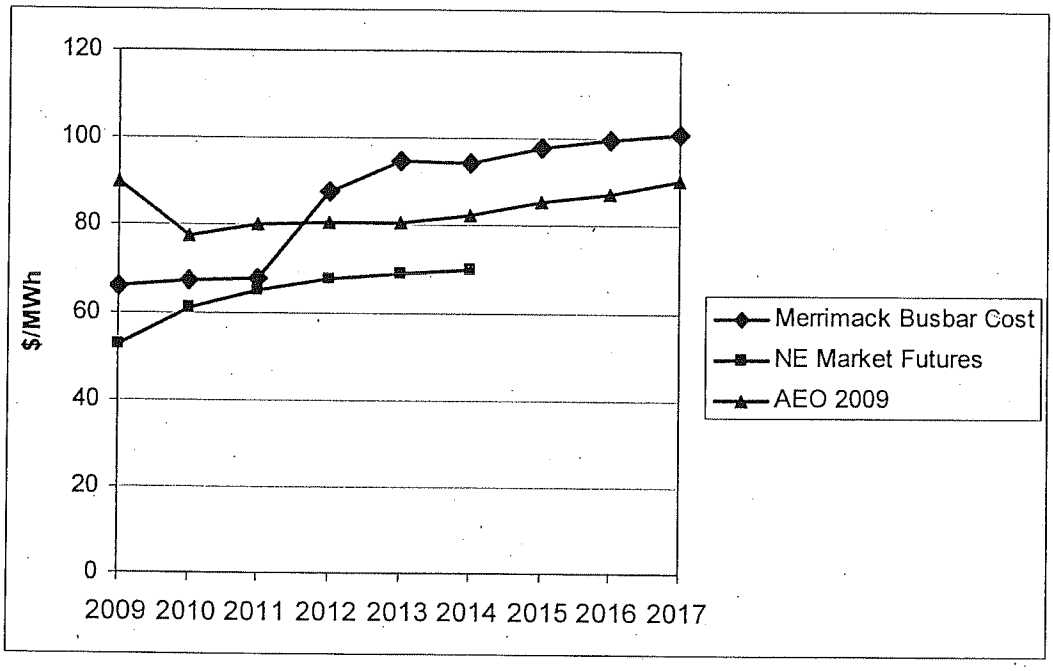
These estimates of future regional excess capacity are based on (1) the actual amount of capacity bid into the future capacity market for the 2011- 2012 power year and (2) ISO-NE's most recent load and energy sales forecasts. Moreover, these estimates are very conservative given that:

- They reflect only very modest amounts of energy efficiency savings – therefore, they do not reflect the additional potential for energy efficiency that has been identified in New Hampshire and the other New England states.
- They do not reflect any additions of the new renewable resources that will be needed after 2011 to meet the renewable portfolio standards.

If more aggressive energy efficiency spending and savings and additional renewable resources were included, even more excess capacity would be available in New England well into the 2020s or maybe even the 2030s.

Not surprisingly, given that there will be excess capacity and that current natural gas prices are low, it also appears that the cost of purchasing power in New England will be substantially lower than PSNH's estimated cost of power from Merrimack.

Cost of Power from Merrimack vs. Cost of Purchasing Power from the Market



The New England Market Futures prices in the above figure were taken from NYMEX's all-hours prices of March 13, 2009, adjusted to include a capacity charge. These NYMEX prices reflect the prices that could be paid today for energy to be delivered through 2014. The AEO 2009 prices reflect the estimated New England generation costs in the US Department of Energy's Annual Energy Outlook for 2009.

B. Energy Efficiency Savings could replace the power generated at Merrimack Station

A February 2009 study by GDS Associates for the New Hampshire PUC examined the energy efficiency potential for the State.[2] As shown in the following two tables, this study found that there was a potential for cost effective energy efficiency of between 255 MW and 330 MW by 2018, in the state as a whole, and between 184 MW and 330 MW just in PSNH's service area.

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2 *Additional Opportunities for Energy Efficiency in New Hampshire, Final Report – January 2009,* prepared for the New Hampshire Public Utilities Commission by GDS Associates, Inc., at page 16.

Potential Energy Efficiency Savings – State of New Hampshire

	Estimated Annual Energy Savings by 2018	Estimated Annual Demand Savings by 2018
	(GWh)	(MW)
Maximum Achievable Cost Effective	2,680	455
Potentially Obtainable	1,404	255

Potential Energy Efficiency Savings – PSNH Service Area

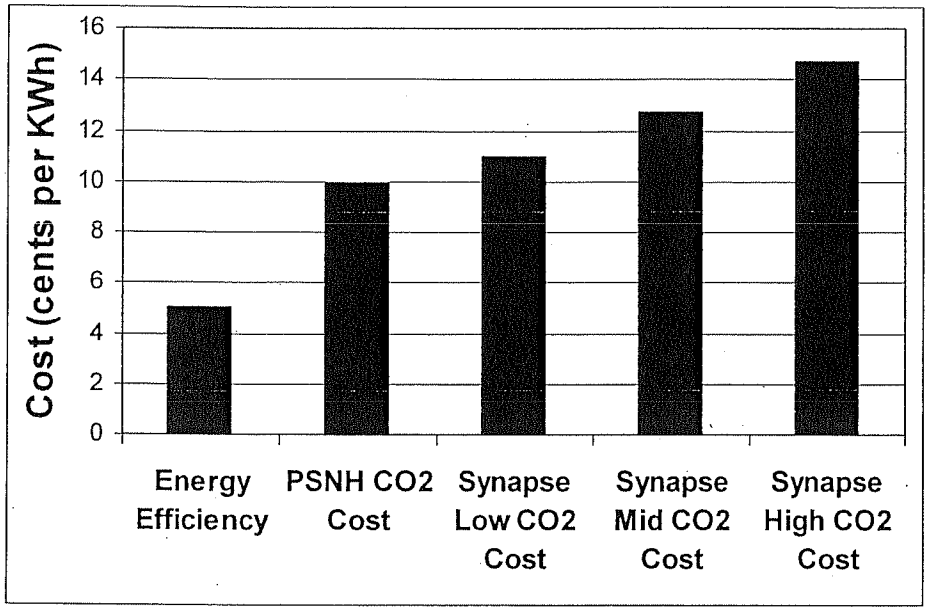
	Estimated Annual Energy Savings by 2018	Estimated Annual Demand Savings by 2018
	(GWh)	(MW)
Maximum Achievable Cost Effective	1,956	330
Potentially Obtainable	1,023	184

Thus, if you only focus on savings achievable in the PSNH service area, by 2018 energy efficiency could replace one-half to three-quarters of the capacity supplied by Merrimack Station and one-third to approximately 60 percent of the energy generated at the plant, and that is if you only focus on savings achievable in the PSNH service area. If you look at the state of New Hampshire as a whole, between one-half and all of the capacity from Merrimack and between 45 and 85 percent of the energy from the plant, could be replaced by energy efficiency savings.

Indeed, it appears that New Hampshire can achieve even higher savings from energy efficiency than are estimated in the GDS report. New Hampshire's 2007 energy efficiency program was the lowest performing in New England. Neighboring Vermont, with about one-half the electricity consumption of New Hampshire, saved 103 GWh of electricity in 2007, compared to 78 GWh in New Hampshire. Vermont's energy savings rates are more than twice that of New Hampshire. Connecticut and Massachusetts's energy savings rates are 25% to 50% higher than those achieved to date in New Hampshire.

It also is reasonable to expect that these savings could be achieved at lower cost than even PSNH's low projected cost of power from Merrimack Station. For example, analyses have shown that substantial amounts of energy efficiency savings are available at expenditure levels of 3 to 5 cents per kilowatt. As shown below, this is substantially lower than either PSNH's projected cost of power from Merrimack or from the cost of power from the plant which reflects the Synapse Low, Mid and High forecast CO_2 emissions allowance prices.

Projected Cost of Energy Efficiency vs. Cost of Power from Merrimack Station



There also is a significant potential for cost effective energy efficiency in the other New England states as well as a substantial potential for cost effective renewable resources in both New Hampshire, specifically, and in New England, as a whole.

C. Other potential sources for power if Merrimack Station were phased out

In addition to purchasing power from the market and energy efficiency, there are other potential alternatives sources for the capacity and energy currently being provided from Merrimack Station. These include: renewable wind and biomass facilities, repowering one or both units at Merrimack to burn biomass, generating more energy at existing and underutilized power plants in the State and the region, and building a new combustion turbine or combined cycle facility at the Merrimack Station site. The cost of generating power at these alternatives can be expected to be lower than the cost of power from Merrimack Station, especially if reasonable CO_2 costs are considered.

D. Transmission system upgrades

Transmission system upgrades to allow additional imports of power are another alternative source for the capacity and energy currently being provided from Merrimack. For example, Northeast Utilities is planning to construct a new transmission line from Quebec through northern New Hampshire (to connect wind resources being constructed in Coos County) to a location near Merrimack Station. The 1200 MW capacity of the line is three times that of Merrimack. Once constructed, this line will provide new energy and capacity resources at less cost than Merrimack, and avoid saddling NH citizens with future costs from new mercury, clean water and greenhouse gas regulations

Finding 4. Energy efficiency programs and developing alternate capacity would create large numbers of new jobs.

There is a reasonable concern that potential construction and permanent jobs would be lost if the Merrimack Station Scrubber Project is not pursued. However, PSNH's claim that the project would create large number of new jobs, 1200 we believe, needs to be scrutinized closely for several reasons. First, the number of new jobs that would be create must reflect the adverse impact of the higher electric rates that PSNH's customers would have to pay for the $457 million cost of the project. These higher rates will dampen economic activity and, thereby, offset the number of new jobs created. Second, the number of jobs that would be created as a result of the Scrubber Project must be measured against the numbers of jobs that would be created if alternate activities were undertaken in place of installing a scrubber at Merrimack.

For example, achieving the cost-effective energy efficiency that GDS Associates identified for New Hampshire in its recent report for the Public Utilities Commission would create an estimated 700 to 1345 net new long-term jobs in New Hampshire that cannot be outsourced to other states or countries. These jobs would last longer than the three year construction jobs that PSNH is offering as part of the Scrubber Project. They also would lead to the creation of hundreds to thousands of long term indirect jobs.

By way of contrast, PSNH appears to be offering a total of perhaps 6 to 10 new permanent long-term jobs once the construction of the scrubber is completed.

Renewable resource alternatives and/or the construction of new gas-fired capacity also would provide both short-term construction jobs and long-term permanent operations and maintenance jobs. Thus, jobs would be created if an alternative to the Scrubber Project is chosen. The real question is which investments would provide more construction and long-term jobs for New Hampshire's residents. Indeed, much of the $457 million cost for the scrubber will be for financing costs and the cost of fabricating equipment out of state. Benefits will accrue to out-of-state workers and out-of state companies.

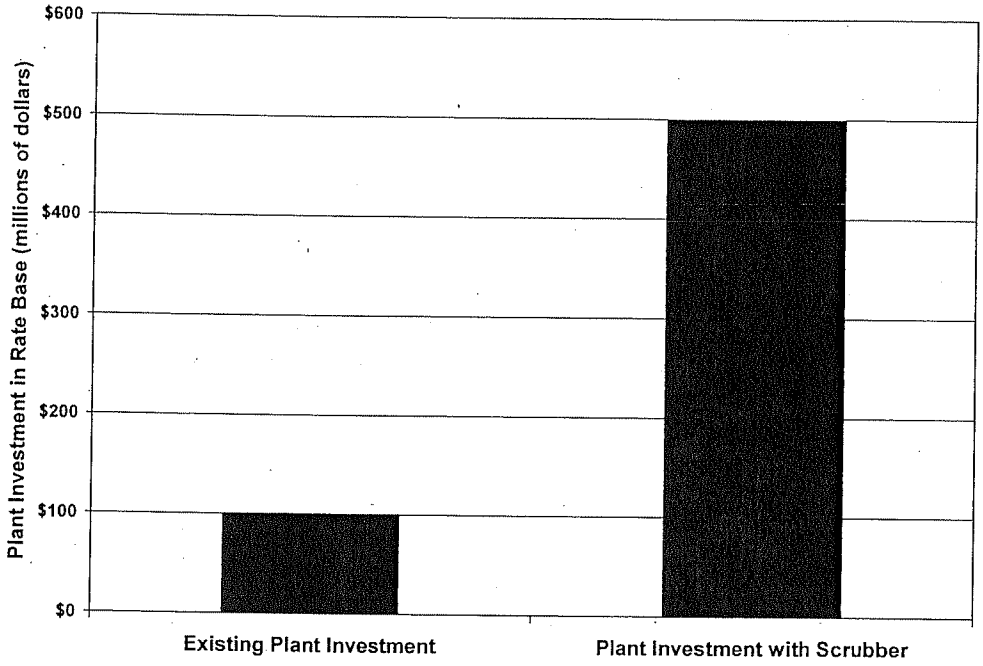
Finding 5. PSNH has a significant financial interest in pursuing the Merrimack Station Scrubber Project.

Under state regulation, PSNH earns an allowed rate of return on its investment in rate base where rate base is the current value of the capital expenditures it has made on plant and equipment. The investment in power plants generally declines over time as the original rate base investment is depreciated (although there are periodic capital expenditures that increase the rate base value of the plant) Thus, an aging plant like Merrimack Station can be expected to have a relatively small rate base value and, consequently, will produce declining profits for PSNH unless an expensive capital expenditure is made and/or the plant is retired and an expensive replacement is built whose cost can then be placed into the utility's rate base. This is the context in which PSNH is pursuing the Merrimack Station Scrubber Project.

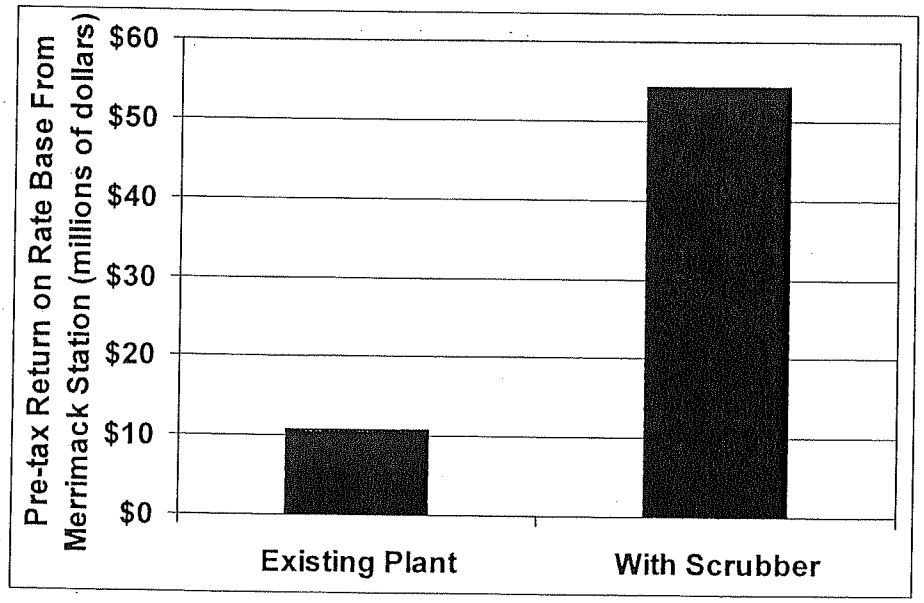
An expensive, capital-intensive investment like the Scrubber Project will dramatically increase PSNH's investment in the Merrimack Station and, consequently, will

significantly increase its pre- and post-tax earnings from the plant. This can be seen in the following two figures which reflect the rate base investments and PSNH's pre-tax return on rate base in the year 2013 if (a) the Scrubber Project is not undertaken or (b) the Scrubber Project is completed and its cost is added to rate base. The year 2013 is being used as an illustration because that is the year the scrubber is scheduled to go into service.

Impact of Scrubber Project on Investment in Merrimack Station in Year 2013



Impact of Scrubber Project on PSNH's Yearly Return on its Investment in Merrimack Station in Year 2013



A less expensive capital project to reduce mercury emissions, such as the installation of an Activated Carbon Injection System, when combined with the purchase of low sulfur coal (which would also reduce mercury emissions) would not increase PSNH's rate base or return on rate base as much as the Scrubber Project because the cost of purchasing the coal is not an investment. Purchasing fuel is treated as an expense, the cost of which is passed along to ratepayers. Therefore, PSNH benefits substantially more from the capital-intensive Scrubber Project than from a less expensive alternative.

Finding 6. PSNH has acknowledged that the contracts it has signed for the Scrubber Project are not "fixed price" contracts.

PNSH has repeatedly said that the majority of the contracts for the Scrubber Project and were "fixed price."[3] However, at the March 13, 2009 legislative hearing, PSNH CEO Gary Long said that there are escalator clauses in the contracts which mean that the price could increase over time. This means that these are not "fixed price" contracts.

Moreover, Company acknowledges that only $250 million of the total $457 million of the estimated cost for the Scrubber Project is under what it has called "fixed price contracts." This leaves over $200 million of estimated project costs exposed to future escalation. Much of this $200 million would be for financing costs that are extremely uncertain in the current financial crisis and, consequently, these financing costs could be substantially higher than PSNH has estimated.

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[3] For example, see PSNH's March 5, 2009 Responses to Questions from the Office of Consumer Advocate and the March 13, 2009 report on *The Economic Impacts of Constructing a Scrubber at Merrimack Station*, at page 3.